COMPUTERWORLD

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NEWSPAPER

Visitor at an Exhibition

French President Valery Giscard d'Estaing was busy on the DP scene last week, visiting Sicob (above) and participating in a week-long event aimed at creating DP awareness among the general public of France. Stories on Pages 4 and 5.

Itel Quits on AS Line, National Semi Takes It

By Tim Scannell
CW Staff

SAN FRANCISCO — Itel Corp., whose financial health has been in doubt for some months, last week announced it will transfer the bulk of its IBM-compatible mainframe business to National Semiconductor Corp.

Disruptions in the industry caused by the introduction of IBM's 4300 series in January and plummeting profits resulting from user uncertainty following the announcement were blamed in part for Itel's relinquishment of its troubled Data Products Group.

Effective today, a wholly owned subsidiary of National Semi — tentatively named Advanced Systems Corp. — will take over Itel's U.S., Canadian, Eoropean and Singapore computer markets. Under the terms of the agreement, Natiooal Semi will absorb about 1,700 uf Itel's sales, marketing and service people thruughout the world, as well as the company's current inventory of unsold and unleased computers, a National Semi spokesman said.

As for its installed base, National Semi will assume all of Itel's maintenance and support responsibilities, including those for users of the higher level Hitachi Ltd.-based machines. However, whether the company will continue to purchase parts from the Tokyo producer is still "under discussion," the spokesman noted.

Since shipping its first Advanced System in early 1977, Itel has installed about 300 of the machines worldwide, the Itel spokesman stated.

Although financial analysts contend Itel's woes stem directly from IBM's announcement of the 4300 series of small- and medium-sized computers, an Itel spokesman was quick to counter that the IBM move was simply one of many contributing factors. He did say, however, that Itel gambled the 4300 announcement would cause only a temporary disruption in the industry.

In addition, the firm's marketing per-

(Continued on Page 6)

Discordant Note Heard at Telecom

By Rex Malik
Special to CW

GENEVA, Switzerland — New telecommunications technologies have reduced rather than increased the number of workers needed by telephone manufacturers and postal, telephone and telegraph (PTT) administrations around the world. In fact, "the geographic separation and the new skill requirements of the computer industry cannot accommodate the electromechanical factory worker."

This discordant note was sounded by Rand V. Araskog, the new president and chief executive of ITT, at the International Telecommunications Exhibition and Forum (Telecom '79), which opened here last week.

Although Araskog foresaw shrinking numbers of communications workers, he also called attention to the severe shortage of software personnel created by the integration of computer and telecommunications technologies. This shortage will grow more severe, he said, adding that it is already the most critical factor limiting the rate of growth in the indostry.

How much of a growth industry telecommunications is can be gauged from

(Continued on Page 5)

NCIC Upgrade Gets Go-Ahead

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Despite longstanding fears of possible government invasion of privacy, the Senate has approved a controversial request from the Federal Bureau of Investigation for updated equipment for its National Crime Information Center (NCIC).

Following months of what one insider termed "an enormous amount of argument," the Senate Judiciary Committee has given the FBI the go-ahead to procure a communications controller to improve NCIC computer links with criminal justice agencies throughout the country.

In a Sept. 26 letter to FBI Director William Webster, signed by Judiciary Committee Chairman Edward Kennedy (D-Mass.) and ranking minority member Strom Thurmond (D-S.C.), the bureau was given approval for the equipment contingent on a set of strict controls. The committee feels those controls will make it impossible for the NCIC to practice "message switching."

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NTIA Backs Deregulation Of Bell Private-Line Service

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — The Carter Administration wants to let AT&T offer private-line services on an unregulated basis, provided the telephone company employs accounting procedures approved by the Federal Communications Commission (FCC), establishes a fully separated private-line marketing subsidiary and accepts FCC oversight on the resale of its private-line services, as well as interconnection of the related facilities, to competing suppliers.

This is one of several recommended amendments to the Communications Act of 1934 which the National Telecommunications and Information Administration (NTIA) sent to Capitol Hill last week. The NTIA is the President's chief telecommunications adviser.

The recommendations, which have not been made public yet, are intended to end an impasse that has stalled efforts in both the House and Senate to write new communications legislation.

Initial comments from the major parties involved in the legislative debate

(Continued on Page 8)

DBMS Links IBM 4300s

By Don Leavitt
CW Staff

FALLS CHURCH, Va. — IQ/Net, a package described as more than a conventional data base management system (DBMS), was introduced here last week by Infodata Systems, Inc. for installations with multiple IBM 4300s.

The company called IQ/Net a data base information management system, and design goals for the product, if met, may justify the terminology. While it is based on experience the vendor has had with its Inquire DBMS, IQ/Net's key feature is its ability to link multiple data bases on multiple machines, a spokesman said.

The first and admittedly limited version of IQ/Net is operational at a West Coast site and will be available for general distribution in December, the company added.

The package provides network and distributed data base management and support for development and maintenance of data bases, no matter where in a network of 4300s they may reside. The data bases under IQ/Net are compatible with those under Inquire, and in time, Infodata expects to manage nets with IBM 370s using Inquire and

(Continued on Page 6)

Future Cloudy On AS Parts

By Tom Henkel
CW Staff

While users of Itel Corp. products were in the dark last week as to what effects Itel's agreement with National Semiconductor Corp. will have on parts and service agreements, the future is even cloudier for users of Itel mainframes supplied through Hitachi Ltd., a Japanese electronics firm.

Whether Itel will continue to supply parts and service for the AS/6, AS/7 and AS/8 mainframes produced by Hitachi is still uncertain; details of the transfer were unclear as of last week.

"The information I've seen so far is significant in what it does not say," according to Wayne Smith, computer supervisor for the New York Power Pool, who seemed the most concerned of the users polled

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Needs Capital as Leases Increase

IBM to Enter Public Debt Market

By Marcy Rosenberg
CW Staff

NEW YORK — Swamped with orders but facing a decline in the outright purchase of equipment, IBM last week announced plans to enter the public debt market for the first time in its history.

The firm plans to raise $1 billion through the sale of debt securities. It will use much of that money to build more production facilities in an attempt to cut down on the long waiting times users face in getting the latest IBM computers.

IBM files a registration statement last Tuesday with the Securities and Exchange Commission covering a proposed public offering of $500 million of notes due in 1986 and $500 million of debentures due in 2004 to be listed on the New York Stock Exchange. An underwriting group managed by Salomon Brothers and Merrill Lynch White Weld Capital Markets Group will handle the sale, scheduled to take place in the middle of this month.

In a prepared statement, IBM said the net proceeds of the offering will be used "to meet increased capital requirements for construction of manufacturing facilities and for rental equipment" financing — requirements the firm expects will continue "for the next several years."

Wall Street Surprised

The firm's plans for a public debt offering surprised many in the Wall Street community in light of IBM's history as a cash-rich company. Proceeds from the offering, combined with $3.35 billion in cash and marketable securities held as of June 30, would give IBM more than $4 billion in working capital.

These funds, however, "would likely be sufficient to meet only a portion of [IBM's] capital requirements," the company said, because of a declining "percentage of equipment sold rather than leased to customers."

Commenting on IBM's lease purchase ratios over the last three years, industry sources noted trends for two groups of the firm's large-scale mainframes: a group encompassing IBM 370/138s and 148s, 3031s and 3032s and a group consisting of IBM 370/168s and 3033s.

For the first group, it was estimated that purchases rose from about 45% of sales in 1976-1977 to 70% in 1978, but took a downward turn to below 50% this year. Purchases in the second group zoomed from between 60% and 65% of sales in 1976-1977 at about 90% the next year, but dropped to below 50% in 1979.

Spurring this trend, according to analysts, is user reticence to make long-term commitments on equipment because the rapid rate of change in computer technology in the form of new products such as the 4300 quickly obsoletes equipment.

"Users don't want to lock themselves into yesterday's 'gee whiz'; they want tomorrow's 'gee whiz,'" remarked Thomas J. Crotty, a vice-president of the Gartner Group/Dillon Read Technology. "Users usually have to hold on to computer equipment for five years to get a payback."

Commenting on IBM's decision to turn to the public debt market for funds, Crotty said, "IBM's message seems to be that it doesn't expect the leasing phenomenon to change over time."

And while the trend to leasing will drain the firm's capital in the short term — in the time it takes to recover the costs of building equipment — "most total money is made on leased, not purchased, equipment in the long haul. It looks like IBM is taking a longer term view," Crotty observed.

Indeed, IBM announced it was arranging a $1.5 billion bank credit line at the close of its second quarter, when the firm recorded its first quarterly earnings drop — 3.4% — in four years [CW, July 30]. IBM has yet to borrow under that credit line, and analysts point to inflationary interest rates as the main reason.

Timing Questioned

In light of the high cost of borrowing money, industry watchers questioned the timing of IBM's decision to make a public debt offering. But because IBM is a first-time borrower, its issues are likely to get a triple-A rating at a cost to the company just slightly above rates for U.S. Treasury bonds "because of safety in investment" in IBM, according to a Merrill Lynch source.

Even so, Crotty believes that for its future long-term needs, IBM will go to the foreign debt market, where interest rates are lower. The firm said only that "additional financing" of "a character and in amounts to be determined" will be arranged if needed.

Those needs, however, mount as IBM continues to invest heavily in additional manpower, product development and production facilities to bring manufacturing in pace with demand.

To maintain its competitive edge, IBM will have to "keep its technology ball moving at a fast rate" in the areas of semiconductor and other memory advancements, Crotty said. Another challenge is "to overcome the production bottleneck that has placed the firm at a competitive disadvantage for delivering products."

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In Week of Special Events, French Public Shown How DP Influences Everyday Life

By Marcia Blumenthal
CW Staff

PARIS — Throughout France last week, citizens were discovering the ways DP influences their daily lives. The vehicle for these discoveries was an event called Semaine Informatique et Societe, roughly translated as "DP and Society Week."

Mounted at the request of French President Valery Giscard d'Estaing, the special week was the culmination of plans that began last December.

The president appointed Philippe Dreyfus the special delegate in charge of organizing the week's events. Dreyfus, who is vice-president of CAP Gemini Sogeti S.A., the largest software and services firm in France, took a six-month leave of absence from his company to direct the planning for the forum, held here all last week.

Best Computer Use

During an interview on the opening day of the colloquium, Dreyfus explained that the government wanted the event to act as a catalyst, sparking debate among French citizens on the appropriate place of information technology within society. "The government wants to foster the best possible use — not necessarily the maximum use — of computers," Dreyfus said.

Some of the issues on which the government expects to receive feedback are the threat of information technology to privacy and employment; the tradeoffs between a mechanistic and a humanistic society; and where the control of the technology should be placed.

"We want to avoid a rejection of the technology, such as the one that has taken place with nuclear energy," Dreyfus remarked.

Just Coincidence?

Despite the government's position that the week is not at all associated with the national plan for a strong computer industry, the time chosen for the forum coincided with the nation's largest industry show and two other DP-related conferences.

Just one week prior to the opening of the Semaine Informatique et Societe, Giscard d'Estaing visited the Salon international de l'Informatique de la communication du Bureau (Sicob), a French-sponsored international DP, communicaitons and office equipment show akin to the U.S.'s National Computer Conference. Sicob last year attracted nearly 300,000 visitors from 117 countries, with 632 exhibitors showing their wares.

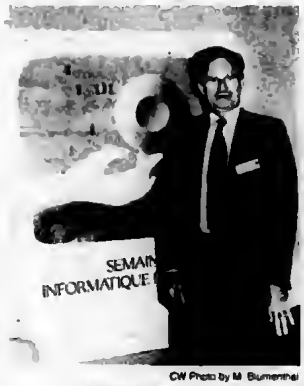
During his visit to Sicob, the president stressed in a special address the importance of the computer industry's contribution to the well-being of the country's economy. He awarded high national honors to three executives of CII-Honeywell-Bull.

International Flavor

Although the French government's emphasis on the computer industry is well known both within and outside France, Semaine Informatique et Societe had litle participation from the traditional "computer crowd," Dreyfus noted.

Rather, about 160 people from 22 countries representing almost every conceivable professional discipline served as official participants in conference sessions on special topics held throughout the week.

Adding to the international flavor of the forum was Zbigniew Brzezinski, President Jimmy Carter's national security advisor, who sent a videotaped address that was shown the first evening of the conference (story above).



CW Photo by M. Blumenthal
Philippe Dreyfus

Exhibits at the modern conference hall displayed myriad uses of the most up-to-date computer applications spanning medicine, public transportation, education and electronic funds transfer. More than 12,000 people were expected to visit the central exhibition in Paris.

Throughout the country, businesses and institutions in about 30 cities and towns opened their doors to local citizens to demonstrate how their organizations used information technology. In all, some 10 million people, about 20% of France's population, were expected to be reached by the awareness campaign.

Survey on Attitudes

In preparing for the week, the organizing committee sponsored a survey of French people's attitudes toward computer technology. The survey questionnaire was printed in a newspaper in Lyons, a large city in central France.

That survey showed citizens are concern that information technology could iocrease unemployment and detract from privacy. On the whole, however, the citizenry does not blame computers for the current high unemployment rate in France, Dreyfus noted.

Citizens generally showed a positive interest in the use of the technology, but were concerned about how it is to be controlled. The fact that people think computer technicians should control the use of computers in society shows a basic lack of knowledge about the subject, one official noted.

Most importantly, labor unions — which are much more highly politicized than in the U.S. — want some control over the use of computer technology, Dreyfus said.

A short time after the completion of the special week, another survey is planned using the same method in hopes of measuring how much awareness the event created among the citizenry.

Dreyfus freely acknowledged that the government has a pivotal interest in developing its domestic computer industry and increasing the use of information technology within the country. "It is, after all, an industry that will help a medium-sized nation survive," he said, adding that France — unlike Germany and Japan — was not destroyed during World War II and therefore did not have an immediate reason to construct modern industries.

However, Dreyfus stressed that the French want to protect their language and cultural history. As an example, he pointed to the data bank of the *New York Times*, objecting to Americans translating and interpreting the cultural institutions of a foreign country.

"We admire the American efficiency, power and capacity for arranging and producting information, but we also fear it," he observed.

Brzezinski Makes Assurances

PARIS — "Information technology can encourage economic and political internationalism or it can reinforce traditional nation-state defensiveness," Zbigniew Brzezinski told participants at the opening-day ceremonies of Semaine Informatique et Societe here last week.

Speaking via a videotaped message because he could not attend the opening of the week-long conference, President Carter's national security adviser stressed that information technology should be "a paramount component of national and international ties," on a par with trade, agriculture and energy issues.

Brzezinski reassured French citizens that the U.S. is deeply committed to the free flow of information. He particularly emphasized that the Carter Administration is convinced goods and services produced by the information industry should be as "free as possible of artificial constraints, whether created by local government, economic policy, nontariff barriers or unrealistic technical standards."

Turning to telecommunications, Brzezinski said these facilities and services should be as transparent as possible and be designed for maximum usefulness to society.

"Differences which arise among nations making common use of information resources must be resolved in an atmosphere of mutual respect and without disrupting international practices," he added.

Brzezinski further pledged U.S. commitment to extending information resources to developing countries.

"None of us can predict the future, but we must all recognize that our mutual interdependence is even greater in an information sense now that computers, international communications links and cultural exchange have made us more reliant on each other," he concluded.

French President Lauds DP Achievements

By Rex Malik
Special to CW

PARIS — President Valery Giscard d'Estaing of France opened this year's major French information processing show here with words of praise for France's achievements in the computer industry.

The occasion was the Salon International de l'Informatique de la Communication et de l'Organisation du Bureau (Sicob), the French equivalent of a U.S. National Computer Conference combined with an exhibition of office equipment and furnishings. The show goes on for two weeks.

With panache and self-assurance, Giscard d'Estaing used the occasion to underscore the position that the French have achieved in DP — without ever mentioning the role of U.S. multinational DP companies.

France now ranks fourth in the world in terms of computer revenues and second after the U.S. in terms of exports, which in 1978 totaled 5 billion French francs, according to Giscard d'Estaing.

CII-Honeywell-Bull, a French venture, is Europe's largest manufacturer of mainframes, and the French firm Sems is Europe's largest minicomputer manufacturer, he said.

In the software and systems arena, d'Estaing claimed that the French firms Cisi and CAP Sogety are the largest in Europe.

The French information industry now employs 320,000 people, 72,000 in manufacturing alone, Giscard d'Estaing noted. Last year, the industry created 25,000 new jobs.

All of this was not achieved by chance, he pointed out. French government policies have led to the creation of five integrated circuit producers, as well as a government agency charged with seeing that the technologies are as widely used as possible.

Giscard d'Estaing said further that France, over the next five years, will be spending 2,250 billion francs on industrial support activities and on ensuring that French technology is diffused as widely as possible throughout all French industry.

Telecom Hears Discordant Note

(Continued from Page 1)

two sets of figures. Speakers from Arthur D. Little, Inc., quoting their world telecommunications study, projected a worldwide equipment market, much of which is digital, of $367 billion between 1980 and 1990.

Dieter Sanden, executive vice-president of Siemens Corp., used other figures to project a 6.5% annual growth rate for telecommunications from 1975 through 1985, which is lower than that for the computer industry, but still leaves the world telecommunications market twice the size of computing by the mid-80s.

The same speaker also noted the growth of data terminals in organizations, pointing out that between 1974 and 1978, use of data terminals within Siemens grew by 60% to 3.4 terminals per 100 employees.

Western Domination

Telecom is both a hard-sell and a prestige show. What is being underscored here yet again is the dominance of the West's industries in telecommunications and digital fields.

The British are using the exhibit to launch their System X, a family of modular telephone exchanges, which cost $300 million to $400 million to develop. The British hope System X will halt the decline of their share of the world's telecommunications market.

The accent is on family: The range is from a multiplexer with a 30-line capacity to large trunk and international exchanges with 85,000-line capacities, which can handle up to 500,000 busy calls per hour.

The most concentrated push, however, is coming from the French, particularly the PTT. On show is the electronic directory terminal, which will eventually be provided free to all telephone subscribers. The terminal comes with a full alphanumeric keyboard and will cost less than 400 francs.

The PTT is slated to introduce the terminals in the Ille de Vilaine area in Brittany in 1981 and expects to install a quarter of a million units. The forecast indicates 10 million additional units will be installed by the end of 1985 and 30 million more by 1992.

The PTT expects to be able to finance the automated directory from what it saves by not expanding the paper-based system. Current directory production consumes 30,000 tons of paper annually.

The PTT also expects to realize savings by reducing personnel; 4,500 directory operators plus 400 controllers are needed in the current system.

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National Semi to Absorb Itel's Mainframe Base

(Continued from Page 1)

sonnel forecast that customer reluctance to acquire new equipment would last only one or two months. But the leasing and purchasing hiatus lasted longer than Itel's planners thought it would, and the hiatus continues to affect customer actions to this day, the spokesman explained.

While the industry waited for IBM to draw its next breath, Itel expanded its marketing and service operations in anticipation of a never-to-arrive business boom. As a result, the distributor has lost millions of dollars since the 4300's debut, including a recently reported loss of $60.2 million for the second quarter ending in June.

"We started showing losses . . . and so what happened was that the customers were saying, 'Well, if Itel is losing a lot of money in its Data Products Group, then historically that's what companies do when they go out of business,'" the Itel spokesman remarked. Customers became "more reluctant to do business with us" for fear "that we were becoming another RCA." (Because of financial difficulties, RCA transferred its computer operations to Univac Jan. 1, 1972.)

For the most part, Itel's Advanced Systems (AS) users expected the current development to occur and are not overly concerned that their maintenance and support contracts and responsibilities will be affected. Although the known details of the agreement are limited to what's been released through the press, a number of Itel representatives have assured users that National Semi will honor all previous maintenance commitments.

However, those users who have Hitachi Ltd.-built processors — the AS/6, AS/7 and AS/8, which account for about 20% of Itel's user base — are a little worried that the acquisition may mean more than just a simple exchange of corporate hands.

"I think that most of the concerns that I pick up right now are more in relationship to Hitachi and whether support will continue for people who have that type of mainframe," according to Denton McCormick, an executive with AM International in Chicago and president of Choice, the Itel user group. "I don't think that people are surprised or shocked by [the agreement] . . . but certainly the people who have National Semiconductor mainframes are maybe not as concerned as the people who have the Hitachi mainframes."

McCormick pointed out that a user group board meeting is scheduled for Thursday and Friday of this week. Representatives from Itel, National Semi and Hitachi will then fill in some of the informational blanks created by the recent arrangement.

Other Details

In addition to establishing a new advanced systems market head, the agreement specifies that for the next three months, Itel will be compensated, according to an undisclosed formula, for any computers or peripherals sold by National Semi. Also, Itel will advance the Santa Clara-based company up to $7.5 million of net working capital through the end of 1980 to cover various administrative and sales costs, including salaries and benefits for former Itel employees.

As part of the arrangement, National Semi released Itel from a previous contract that committed the firm to purchasing a substantial number of computers from National Semi and has worked out procedures allowing Itel to pay off its outstanding balance.

However, the agreement — which has been under discussion since early summer — does not mean that Itel will completely fade out of the computer distribution picture. Under the terms of the agreement, Itel will maintain its IBM-compatible operations in Latin America, Japan and Australia. There, the troubled firm will also continue to remarket up to $1.5 billion worth of DP equipment as customer leases run out over the next four or five years.

Meanwhile, at least one computer manufacturer was optimistic about the Itel-National Semi developments. Kent Crombie, director of computer systems marketing for Cambridge Memories, Inc. in Waltham, Mass., considered the corporate shuffle to be little more than an exchange of names.

"The end user will end up dealing with a manufacturer rather than a third-party company. In the long term, that is probably in the best interest of the end user," he said.

Future of AS Parts Cloudy

(Continued from Page 1)

last week.

"From the correspondence I've seen, National Semiconductor is taking over all Itel computer operations, but it begs the question as to the resolution on the Hitachi equipment.

"We have service contract agreements with Itel for spare parts for eight years and a continuing on-site maintenance force for the life of our lease. I fully expect it to honor that commitment," Smith said.

The fate of the AS/6 concerned J. Malakoff, DP director of Beckman Instruments, Inc. in Fullerton, Calif. Malakoff said changes in IBM microcode could turn the Itel CPU into a digital lame duck.

"The ability to remain plug-compatible with IBM requires a group that can handle microcode and can maintain any changes IBM may put forth in the future. Second-level technical support is guaranteed by Hitachi to Itel, and it is guaranteed to be able to pass through new organizations." If Hitachi doesn't remain an integral part of the Itel family, that could change, Malakoff said. However, Malakoff said he wasn't worried about maintenance.

Homien Liu, DP director at Pacific Gas and Electric Co. in San Francisco, said changes in IBM microcode would hurt IBM more than they would hurt Itel. For that reason, he said he has no worries about the merger from either a service or technical standpoint.

Richard Cohen, district manager for computer operations at New York's Rochester Telephone Co., is more worried about the uncertainty surrounding the transfer than the transfer itself.

"I don't see any potential problems, but I haven't been able to find anybody to tell me exactly what the [new] relationship is and what the specifics are. At this point I have no reason to feel uncomfortable about the Hitachi installed base not being supported."

DBMS for 4300 Links Multiple Data Bases

(Continued from Page 1)

nets with 4300s using IQ/Net.

IQ/Net also provides a "user-friendly" query language very much like Inquire's for both technical and nontechnical users. Text editing, storage and retrieval have been built into the system, as have security and control capabilities that limit access to critical information, the spokesman continued.

When all these objectives have been met and the using organization has multiple 4300s, the result should be a system in which individual data bases can be established and maintained "locally" — where they are most heavily used — but accessed by any other authorized user in the network.

'Network Locator' Software

The key to the IQ/Net operation and its ability to let users work with data wherever it resides is the Network Locator data base and control software that will be at every processor using IQ/Net. As its name suggests, the Network Locator tags requests for data — which may involve several data bases — with the correct address of the data. It sends the request to the processor that controls the information, along with the address from which the request originated, and passes the requested data back to the requesting terminal once it has been received from the appropriate 4300.

All that control, which is based on CPU address primarily and not disk pack address, as with most "local" DBMS, is transparent to the end user. The query language he uses contains full Boolean retrieval logic, computational and data manipulation commands, an integrated report writer facility and data base maintenance capabilities, the spokesman said.

In common with other DBMS, IQ/Net also provides a Procedural language interface. This enables users to access and update IQ/Net — and ultimately Inquire — data bases from application programs written in assembler, Cobol, Fortran, PL/I and presumably any other language that supports normal CALL facilities.

The text manager feature includes tools for building a variety of indexes to textual materials such as abstracts, legal documents, transcripts or correspondence and a language to provide for proximity searching or the ability to find specific passages in the text material.

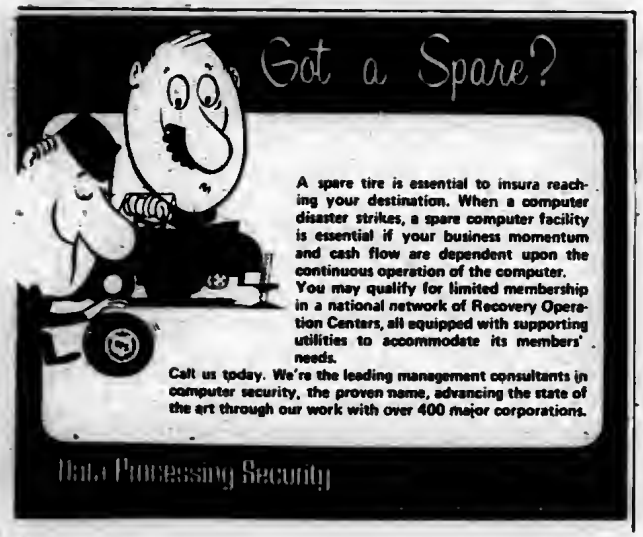
IQ/Net will run under a variety of operating environments appropriate to the 4300. Although IBM's DOS/VSE is expected to be the primary environment for 4331 users, the initial IQ/Net release will be for sites using Virtual Machine facility (VM/370) and VS1, the spokesman said.

Various on-line or teleprocessing options will be available as well. The facilities of the Conversational Monitor System (CMS) will be in place for the VM/370 users if they want it. Support for CICS and probably, in time, other commercially available teleprocessing monitors, will also be part of IQ/Net.

Infodata said the price/performance of IQ/Net coupled with the price/performance of IBM's 4300 may well lead to dedicated application processors. Users can closely control the "care and feeding" of their data, but others — a corporate data center, for example — can reach into that data for summary information.

The system comes in two models and costs either $40,000 or $50,000, depending on the facilities required. Extra-cost options include support for additional operating systems or teleprocessing systems ($5,000 for each addition), the text search facility ($12,500) and a thesaurus processor (also $12,500).

The Network Locator data base software will also be an extra-cost option, but the cost has not yet been determined. Infodata said from 5205 Leesburg Pike, Falls Church, Va. 22041.



Some Vendors Will Be Missing

Info to Spotlight Small Systems, Starts Oct. 15

By Tom Henkel
CW Staff

NEW YORK — Minicomputers, word processing (WP) equipment and other small business systems from about 165 exhibitors will be the main attraction at this year's Information Management Exposition and Conference (Info '79) scheduled here Oct. 15-18.

However, the show may not be all its sponsors hope it will be. Shades of deja vu and a faltering economy have caused about 15 large vendors to shy away from this year's event, according to Info officials.

Vendors' lackluster interest in Info '79 can be partly attributed to the National Computer Conference held here in June, Info spokesman said. Not only are the two shows in the same town, they're in the same building — the New York Coliseum. Some vendors indicated that combination spells East Coast overkill.

Although it may not make up for the absence of large vendors, canceled booths have been filled with smaller companies. More software houses are getting into the exposition business, and the usual printer, terminal and other peripheral vendors will also be on hand, the spokesman said.

The overriding theme of Info '79 will be WP and its relation to other computer systems. However, as one Info '79 official put it, it will be difficult to find anything that even looks like a large mainframe.

"It was an unfortunate combination of NCC and our show — and it hurt us. Almost all [the companies not attending the show] gave the same reason: they exhausted their budgets at NCC and there was a falloff in business: Consequently, they didn't want to go to the same market twice," the spokesman said.

However, vendors indicated they would be in the show next year [when NCC is in Anaheim, Calif., according to the spokesman.

Since the Info show traditionally alternates between New York and Chicago, the firm managing the show, Clapp & Poliak, Inc., didn't foresee a problem with NCC. The firm felt the two shows appealed to different audiences. However, economic uncertainty coupled with a slight drop in third-quarter sales caused some vendors to question Clapp & Poliak's thinking.

Absent Vendors

Missing from this year's show will be Honeywell, Inc., IBM's Data Processing Division, Xerox Corp. and Perkin Elmer Corp.

IBM still plans to send its General Systems Division and Office Products Division to the show. NCR Corp. has also cut its presentation at this year's Info '79, sending only its Micrographics Division.

Honeywell and Perkin-Elmer originally planned to attend the show, but dropped out at the last minute because both companies had difficulty getting their hardware ready, a Clapp & Poliak spokesman said. A Honeywell spokesman said changes in marketing strategy spawned the dropout, and a Perkin-Elmer spokesman declined to say why that firm chose not to attend.

IBM and other mainframers, including Hewlett-Packard Co., Univac, Nixdorf Computer Co. and Wang Laboratories, Inc., said they will show up at Info '79, but they won't be showing any new equipment.

Show officials however, are not convinced by IBM's repeated denial that it will make a product announcement at the show. One spokesman said IBM is up to something because it reserved a private room at the Coliseum. The spokesman added that private rooms are usually reserved for press conferences on announcements.

Tandem Computers, Inc. and Basic Four Corp. said they have new products in the offing, but neither mini vendor was sure it would make the Info '79 announcement.

Despite Clapp & Poliak's insistence that Info '79 draws a different DP devotee, vendors still aren't buying it. Nevertheless, Clapp & Poliak is hoping a record gate will be conclusive proof.

The firm is pushing for advance registrations for the conference segment of the show. Boasting about 800 preregistrations — about 300 more than were made last year — Clapp & Poliak is predicting a record turnout of up to 25,000.

The combination conference and exhibition costs $265 for all three days of the show. Admission to the product exhibit only is $5. Combination packages are also available. For more information contact Clapp & Poliak at 245 Park Ave., New York, N.Y. 10017.

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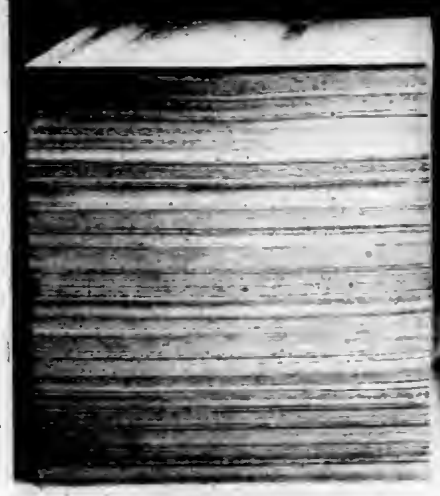

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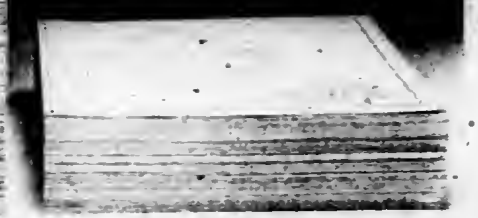

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NTIA Wants Private-Line Service Deregulated

(Continued from Page 1)

suggest the NTIA has found a basis for resolving at least some of the outstanding conflicts. Besides recommending deregulation of private-line services, the agency also:

- Recommended that Congress scrap the 1956 AT&T Consent Decree, thereby enabling Bell to offer data processing and other nontariffed services. But AT&T would not be allowed to offer services designed for a mass audience — services like Teletext, the TV terminal-based information retrieval system designed for the home.
- Said that AT&T should continue to offer local and long-distance — Message Toll Service (MTS) — telephone service directly, but that the FCC should study the need for a separate MTS subsidiary.
- Advocated giving states control over "local or intradistrict" communications services and giving the federal government control over all others.
- Supported the imposition of access charges on "all interdistrict [federally regulated] carriers directly or indirectly connected to the telephone network." A "transition policy board" would have "decisional responsibility" to resolve such outstanding problems as the demand of rural telephone companies for a share of the communications revenues paid by urban customers.
- Endorsed giving the FCC "explicit authority to set technical standards to promote the national defense and security."
- Said the pending legislation should not help or hinder AT&T's effort to defend itself against the antitrust charges brought against it by the federal government and now being prosecuted by the Justice Department.

'Most Important Issue'

Regarding deregulation, which, the NTIA termed "the most important issue," Congress was advised to classify telecommunications submarkets into three groups: those which provide "effective competition" where no "dominant carrier" is present; those where a dominant carrier is present and effective competition doesn't exist; and those where effective competition exists but is threatened, at least potentially, by the presence of a dominant carrier.

The NTIA said all services assigned to the first category should be totally deregulated. It advised Congress to write language into the pending legislation explicitly assigning data processing to this category.

The bill, or the accompanying legislative history, should also make it clear that Congress would like several other services offered on a deregulated basis, the NTIA said. Terminal equipment, resale carriers' offerings, value-added services and public message services (domestic telegraph, electronic mail and related offerings) were specifically mentioned.

Long-distance telephone service would be the only one put into the second category. It would be subject to full FCC regulation.

The third category would be reserved for private-line services. A dominant carrier could enter this market and operate without regulation provided it offered the related services through a fully separated subsidiary and employed accounting procedures specified by the FCC which ensured fair competition unsubsidized by revenues from noncompetitive services.

The NTIA argued that this scheme would provide adequate control over a dominant carrier because competition in private-line services is growing from such firms as Xerox Corp. and Satellite Business Systems. Anticompetitive activities by a dominant carrier would be subject to prosecution under the antitrust laws, and the FCC would be given power in the pending legislation to impose additional restraints if they were needed.

Defining the Terms

Two key terms — "dominant carrier" and "fully separated subsidiary" — were defined in the NTIA draft.

A dominant carrier operates "in a substantial percentage of all interexchange telecommunications markets" and has the ability, "in a substantial percentage of the markets where it provides such services," to raise or lower prices without "significantly affecting" customer demand.

A fully separated subsidiary does not share directors, officers, employees, "financial structure" or facilities with its parent company and deals with the latter on the same terms and conditions it employs in dealing with onaffiliated companies.

Regarding the AT&T Consent Decree, NTIA said basically that it has been made obsolete by the convergence of communications and DP technologies. Requiring the FCC to differentiate between the two is not only impossible but unnecessary, the agency indicated "so long as the [FCC] is given ample authority to protect the public" through accounting and separate subsidiary restrictions.

Discouraging Effects

The agency wants AT&T barred from "mass media" services because its "size, wealth and control of the facility infrastructure would tend to work against diversity by discouraging other firms from entering" the market. The proscribed services should include public and pay cable TV, electronic publishing and electronic information services such as Teletext.

But NTIA added that AT&T should be allowed to own the underlying facilities for these services and market them to unaffiliated companies. Also, the telephone company should be allowed to offer "mass media" services closely related to its present operations — such as weather, time and telephone directory information.

Congress OKs Funds to Upgrade NCIC

(Continued from Page 1)

Liberal members of Congress, including Kennedy, have for years opposed an FBI proposal to operate a central message-switching facility linking state and local law enforcement groups with the NCIC's Computerized Criminal History (CCH) file.

"While the committee recognizes that the Computerized Criminal History file is but one of the eight files accessible through NCIC, its commitment to individual rights has required it to delay any modification of NCIC equipment until assurances were forthcoming from the FBI that it would take the necessary precautions to protect those rights," the letter said.

FBI as 'National Police Force'

A nationally linked CCH file, it is feared, would amount to a national crime date bank, control over which would effectively make the FBI a national police force. Opponents of message switching argued the FBI would then have practical hegemony over state and local law enforcement agencies.

Because of this opposition, Justice Department officials have on several occasions assured Congress no message-switching activity would be undertaken without explicit approval from Capitol Hill.

However, in an April 26 letter to Kennedy, Webster said a new communications controller was "desperately needed" to replace "obsolete" equipment to maintain the current level of Senate-approved NCIC services to local police [CW, May 28].

OTA, Inslaw Studies

Action on the request had been held up pending completion of a full-scale study of the NCIC by Congress's Office of Technology Assessment (OTA). Although that study is not yet completed, the communications controller was approved by the Judiciary Committee following a special assessment of existing and proposed NCIC equipment by OTA and the Washington-based Institute for Law and Social Research (Inslaw).

Both studies agreed that the current system needs replacement. Inslaw found "the existing IBM 2705 is slow, obsolete and difficult to modify because of the fact that it is 'hard-wired.'"

According to the OTA study, "procurement of the equipment called for . . . would enhance the ability of the system to process and route messages, improve the effective capacity and performance of the existing [IBM] 360/65 computers and increase the reliability of the system."

However, both research groups also agreed that the equipment is, as Inslaw noted, "eminently suited for message switching." OTA remarked that "even if the equipment as delivered did not include message-switching software, such software is readily available."

The impasse over the FBI's need for advanced equipment and congressional fears about message switching was broken when Webster agreed to a set of provisions that, the Judiciary Committee felt, would preclude any message-switching activity.

As outlined in the letter from Kennedy and Thurmond, the provisions include an agreement by the FBI to lease the communications controller "for as short a period as feasible, and in no case for a period longer than two years." This will ensure that "acquisition of the processor will not undermine [the OTA full-scale] study nor preclude committee options as to the future of NCIC," the senators said.

In addition, the letter noted, the FBI has agreed "not to acquire a message-switching option with the controller, not to message switch data between states, to program the software to give requests for CCH data the very lowest priority and to permit biannual General Accounting Office audits of controller transmissions and to ensure compliance with these commitments."

Audit Credited

According to one committee aide close to the lengthy controversy, it was the biannual audit provision that turned the argument to the FBI's favor.

"A lot of people here felt there was a very legitimate series of caveats and controls placed on [the FBI]," the aide said. "Temporarily, people are willing to go a step down the road [of increased NCIC capability].

"There has to be some kind of trust somewhere," he said. But "if the audit reveals at any time that there is message-switching activity, there will be immediate reaction from Capitol Hill. And it will be the strongest possible reaction."

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Hollings Wants Rewrite Act To Include Deregulation Of Hybrid Communications

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Hybrid communication services will be totally deregulated; "a few essential safeguards" will be imposed on dominant carriers such as AT&T to prevent parent companies from unfairly cross-subsidizing their subsidiaries; and telephone toll services will be separated "organizationally and financially" from local exchange services.

These are some of the modifications Sen. Ernest Hollings (D-S.C.) plans to make in the Communications Act of 1979 (S. 611), now pending before his subcommittee.

In a recent speech to the Southeastern Telecommunications Association, a users group, Hollings also said the present provisions of S. 611 covering telephone company-supplied terminal equipment will be changed. Instead of deregulating all such equipment, the bill will require that prices and service terms remain subject to regulation by the Federal Communications Commission (FCC) for five years.

"It would be highly disruptive to force the telephone companies and their customers to abruptly change the way they do business," he explained.

Hollings has "some hope" a new communications act replacing the one passed in 1934 will get thruugh Congress in the foreseeable future. But, he added, this will be impossible if the carriers and their opponents do not develop a consensus on the issues on which they've been arguing. He is "increasingly concerned that the rhetoric has cooled, but the positions have not softened."

One key disagreement is whether Congress, in enacting new communications legislation, should protect AT&T from prosecution under the antitrust laws for the company's past actions. "Anyone who believes S. 611 or any communications legislation can or will affect the antitrust laws in any way is mistaken . . . To remain silent on the issue would merely beg the question and invite confusion and dispute," Hollings said.

AT&T, which has been trying to get an antitrust exemption written into the pending bill, also has been resisting the physical separation of its Message Toll Service (MTS) and local exchange services. On this latter point, Hollings said, "All interexchange [toll] services are largely substitutable, granted . . . MTS will remain the dominant public switched toll service for years . . . but Execunet, CCSA, Wats and most private line services are all, in varying degrees, substitutable for each other and for MTS.

"Because [of this], a large, vertically integrated company would have a strong temptation to insulate its MTS services by integrating them functionally and financially with local exchange plant and equipment . . . consequently, we believe there must be a method for separating MTS organizationally and financially from local exchange services."

Regarding AT&T's often-stated argument that providing long-distance and local exchange services through separate companies would cause service to deteriorate by destroying the present "unitary" network management structure, Hollings said, "We cannot agree with this position.

"Clearly, subsidiaries essential to this management activity can and must deal with each other, just as various operating companies deal with each other now and just as totally separate companies deal with each other now . . . We recognize network management as an important component of that goal and believe the bill will enhance rather than subvert that component."

He then seemed to invite, or challenge, AT&T to come up with a better altnerative. "While we do not accept the [unitary] network management argument, we are not committed to the separate subsidiary as the only method for preventing cross-subsidization. We have been open to any alternative suggestions that meet the basic objectives I have outlined," Hollings stated.

Legislative Safeguards

The dominant carriers may also be required by the pending legislation to establish marketing subsidiaries for hybrid services — those combining data communication and DP, Hollings said. There is really no reason for government regulation of such services, he argued, because the presence of a number of suppliers in the market makes it "difficult to abuse one's control of leased facilities."

Furthermore, Hollings noted, deregulation "is the best way" to prevent hybrid services from becoming "a door through which regulation is extended to the DP field."

However, to preserve true competition, the telephone companies should be prevented from using their monopoly revenues to finance competitive hybrid services, he explained. The safeguards incorporated into S. 611 consist of "a combination of the new cost-based accounting system developed by the FCC and AT&T and, more important for the larger companies, the notion of separate subsidiaries for competitive services . . .

"If a subsidiary meets a few essential safeguards — prohibiting jointly owned equipment with other parts of the company, [barring shared] employees and management and requiring full compensation to affiliated companies for all services and equipment — then the opportunity for cross-subsidy is substantially diminished."

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Power, Phone Outages Worse Than Floods

Hurricane Frederic Takes Toll of Southern DP

By Brad Schultz
CW Staff

MOBILE, Ala. — Just hours before Hurricane Frederic's 100 mile-per-hour winds roared through Alabama's capital recently, the city's largest bank prepared its computer facility for the worst.

A secretary at Mobile's Merchants Bank started tracking Frederic while the storm still thrashed hundreds of miles from the U.S. mainland. Unsure of whether Frederic was really coming to Mobile, Merchants' managers formed their strategy for coping with the hurricane a full day before it hit the city late in the evening of Wednesday, Sept 12.

Senior Vice-President Jim Kilpatrick's clock radio awakened him Wednesday morning with the news that Frederic was definitely coming his way after pounding the West Indies and Florida Keys. Weather experts now call Frederic one of the century's three most destructive hurricanes and estimate total damages at about $1.5 billion.

Kilpatrik's first thoughts of action focused on the thousands of transaction records Merchants stored on magnetic tapes in its Mobile headquarters basement. He expected Frederic to flood that basement.

The banker raced to his telephone with intentions of summoning key DP personnel to evacuate the tapes, but found the instrument dead. Frantic calls by Mobile residents had overloaded the area's phone resources a half-day before Frederic's arrival.

Kilpatrick drove to the home of Merchants' vacationing operations manager. Rousted from bed, the manager joined Kilpatrick in coordinating the evacuation of the basement tapes and powering down the bank's 4M-byte IBM 3031. That mainframe and a vault containing Merchant's "current" magnetic tapes were located on the bank building's third floor, safe from any floodwaters.

Bank personnel removed current tapes from the third floor vault to create space for the backup tapes normally kept in the basement vault, Kilpatrick recalled in a recent interview. The backup tapes were then evacuated to the third-floor vault and the current tapes were taken to Merchants' nearby repository on Spring Hill — a site deemed high enough above sea level to be flood-safe.

Worst Consequences

But power and phone outages rather than floods proved the most damaging consequences of Frederic to Merchants and other DP users polled by *Computerworld*. Blackouts forced them to scramble for generators — Kilpatrick said he knew of no user in Mobile with an uninterruptible power supply (UPS) — and the lack of phone service froze most remote processing operations.

About 200 miles upstate from Mobile, the First National Bank of Birmingham encountered Frederic a day after concluding a study of whether it should acquire a UPS. The hurricane also caught First National in the process of replacing two Burroughs Corp. mainframes — a B3700 and B3800 — with an IBM 370/125-2 under DOS and a 370/148 under OS/VS2.

"With several different operating systems running at once, things were pretty frantic," DP Vice-President Charlie Wilcox recalled. First National managed to power down its systems several hours before Frederic powered down Birmingham and knocked out much of the city's phone service, but the bank could not resume DP operations until Saturday, Sept. 15, when a generator arrived. A week later a second generator was added.

By knocking out power, Frederic knocked out the computer systems needed to get money to people. First National fell days behind in generating payroll checks — a task it performs for 112 companies, Wilcox noted.

And a wholly owned subsidiary, Mobile Data, Inc., temporarily lost its ability to produce paychecks for Mobile's waterfront stevedores and people employed under the Comprehensive Employment and Training Act.

Kilpatrick observed that Mobile suffered less downtime as a result of power problems than did other areas hit by Frederic for two reasons. First, power cables are kept largely underground in the inner city; in the suburbs, the hurricane knocked trees and other debris into aboveground cables.

Second, the Alabama Power Co. gave higher priority to restoring current to the citizens' band and commercial radio/TV stations concentrated downtown because they were media for broadcasting emergency information.

But power and phone outages froze 150 terminals at 16 outlying Merchants Bank branches. Those terminals normally communicate in on-line mode with Merchants' downtown 3031, which runs under DOS/VS and is supported by four IBM 3350 disk units and six dual-density Model 3420 tape drives.

In Pascagoula, Miss., some 40 miles from Mobile, Frederic cut power to Ingalls Shipbuilding, including the two 370/158s that drive payroll and credit union applications serving 17,000 employees. Power problems and damage to rooftop air conditioning units have forced this division of Litton Industries, Inc. to trim system workloads, according to DP Vice-President Wesley Maisch.

A number of the users CW contacted observed that while Frederic has cut their systems' capacities for work, the hurricane also cut the volume of work their systems need to do.

Working in dim light and without air conditioning in the hot weather that followed Frederic, Merchants' tellers have processed a limited number of personal check transactions in the past two weeks, enabling people to buy chain saws, generators and other gear as they start to dig out from fallen trees and rubble. But the Merchants 3031 has far less than the usual volume of transaction to handle, Kilpatrick said.

Source of the Problem

MOBILE, Ala. — When floods, earthquakes or major storms strike a large area, DP users often suffer a loss of electric power to their systems — aside from any property destruction.

Such blackouts sometimes occur because of computer system failures at the power companies themselves. The power loss that still plagued much of Alabama several weeks after Hurricane Frederic hit partly occurred because of Alabama Power Co.'s problems with modems and controller units, according to its customer service manager, Gordon Kenny.

For three days after Frederic hit the state, Alabama Power could not get adequate technical support to address those problems, Kenny said in a recent interview. This resulted from transportation difficulties, phone outages and the fact that systems technicians were overloaded with work.

Alabama Power's breakdowns affected four lines between the utility's Mobile headquarters and host processors maintained in Atlanta by Southern Co., the umbrella organization for Alabama Power, Mississippi Power Co., Georgia Power Co., and Gulf Power Co.

In Mississippi, Frederic reportedly caused blackouts by toppling towers that normally hold up power lines. Many of the Bayou State's DPers may go without commercial current until Mississippi Power raises the towers — probably with the assistance of helicopters, one user observed.

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'So the Day They Retired Me With Only a Gold Watch, I Wiped Out All the Disk Files.'

Carter Backs Updated DP for Selective Service

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The Carter Administration, apparently unwilling to risk the political fallout of resuming face-to-face military registration, is backing beefed-up DP resources for the Selective Service System (SSS) as a way to guarantee adequate troop mobilization in a time of national emergency.

Although many members of the House of Representatives see the cumputer-based plan proposed by the SSS as unreliable and one that would furce the country to fall back on nuclear arms, that body nevertheless went along with the President's recommendations here recently.

After lengthy debate, it struck a registration provision from the 1980 Defense Department Authorization and on Sept. 14 approved the measure.

The provision, recommended by the House Armed Services Committee, was replaced after six hours of debate with a section requiring the President to study the need for registration and the feasibility of SSS emergency plans. Under the amendment, proposed by Rep. Patricia Schroeder (D-Culo.), Carter will have until Jan. 15 to report to Congress on those plans.

The early version of the $42 billion defense spending legislation had called for resumption of the traditional registration by all males turning 18 after Jan. 1, 1981.

According to the scenario currently preferred by the SSS, however, there would be a one-day mass registration 10 days after emergency mobilization instead of an established registration program. Using a far-flung network of minicomputers, the SSS would register all affected males at the same time at some 50,000 polling places around the country [CW, June 25].

That strategy has been questioned by several government studies, including those by the Congressional Budget Office and the General Accounting Office.

DP Nightmare

Rep. G.V. (Sonny) Montgomery (D-Miss.) was supported in his opposition to the plan by registration proponent Rep. Marjorie Holt (R-MD.), who described the DP nightmare of trying to process millions of registrants in a few days time:

"For the first nine days after mobilization, some 40,000 to 50,000 local polling places will be opened and equipment and forms distributed.

"The polling places have not been identified, nor the more than 50,000 volunteers to man them recruited. There are no forms in place for this purpose.

"However, under this plan, this organizing must occur, no matter what turmoil this country will be in, because on the 10th day four million males — the 19- and 20-year-olds of the country — must register, all that day.

"From the 10th day to the 15th day," Holt continued, "all of the registration forms must be transported to 460 keypunch machines for entry into regional minicomputers — no matter that the selective service does not own any of this equipment and, by [its] own estimate, could not have it in any operable state for two years from whatever point [it is] provided the funds by Congress.

"From the 15th day to the 20th day, the minicomputers must send this information to a central computer, where it is checked and processed, a lottery conducted and then induction notices sent out — three million by mailgram — beginning the 21st day.

"However, if even one minicomputer fails, or its plug is pulled by someone who does not take kindly to the mobilization, or any single registration site fails to get its information in on time, the whole process must stop because selective service cannot issue induction notices to anyone in a year group until all of those eligible have been processed."

For its part, the SSS admits the plan is not fully developed, but remains confident it can be made to work with adequate funds and development.

The Administration this year asked Congress for an increased SSS budget to allow major upgrading of the agency's DP facilities.

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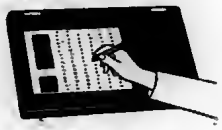

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With a Little Data Crunching

Miss America Correctly Predicted

By Jay Woodruff
CW Staff

DEKALB, Ill. — If you are entering the Miss America Pageant next year, you won't win if you twirl a baton, tell jokes or dance. It's also not good to come from a large city or have southern European ancestry.

These are some of the results of Prof. George L. Miller's analysis of Miss America winners from 1935 to the present, upon which he based his prediction of who would win this year.

Eight hundred hours of research enabled Miller, on the staff of Northern Illinois University here, to correctly predict that Miss Mississippi — Cheryl Prewitt — would be treated to a Bert Parks rendition of "Here She Comes" when she was crowned this month in Atlantic City.

Miller, along with college statistician Chipei Tseng, collected and input data on 2,500 Miss America contestants through the years on about 7,500 punch cards. Eyebrows were raised at the school's computing facility when the two researchers began inputting 13 variables about such items as knees, height, bust size and place of residence.

The information was processed on IBM 360/67 and 370/148 mainframes located at the school's computing room using the Statistical Analysis System (SAS) software from SAS Institute, Inc. of Raleigh, N.C.

Crowd Pleaser

Why did Miller look at gams this year when he might have looked at yams? Partly to attract attention. Last year his labors on an energy cash flow modeling paper attracted only 15 persons when he presented the results in a two-hour talk at the American Statistical Association conference.

This year, when he presented "The Anatomy of Miss America," about 600 persons showed up and the presentation stretched to four hours.

"The six other papers presented had an average attendance of 15 or 16 persons. They had all this high-quality statistical work, but they didn't have something to bring them in," Miller explained.

The professor found that the data was available for study and correctly surmised that "it would be interesting to a lot of people and also quite interesting to me." He received some aid from the Miss America Pageant, but its small staff and hectic schedule forced Miller to leaf through old newspapers and microfilm to gather all the statistics he required to make a prediction.

The conference attendance this year showed the professor's work to be worth something to the figure-hungry statisticians who attended his presentation. "They really went for the algorithm I had for predicting Miss America," he noted.

Predictable Winners

Miller expressed the hope that the results of the study might prompt local pageant promoters to think about the kinds of people they choose to represent their locality or state.

"I know one of the local groups here had a very attractive individual who played the flute. The judges decided not to give her the local prize because she played the flute," he recalled.

"Instead, they chose an unattractive pianist," which was a mistake because a flutist had a greater chance of winning the pageant.

Miss America contestants can walk into the competition with a number of strikes against them, Miller's analysis of past contestants and winners indicated. For example, winners tend to come from small towns because more small towns exist to send local winners to the state contest.

Usually, winners do not come from southern or southeastern Europe; judges seem to prefer western or northern European backgrounds. Moreover, if the contestant falls outside a height range of 5-ft-2-in. to 5-ft-10-in., her chances of winning are slim.

Swaying Judges

Based on the professor's success in predicting the winner this year, one might think him eager to try it again next year. But Miller has mixed feelings.

"I'm afraid that if I make a prediction and it is right, they will say the judges were swayed by the prediction. If it is wrong, then they'll say the judges were antagonized.

"If there is an alleged computer expert out there making the prediction, the contestants might worry a little about it. I've got enough things there in the study already that will worry them, such as the fact that a baton twirler doesn't have any chance at all of finishing first."

Desktop Unit Helps Create Buck Rodgers' Spacecraft

HOLLYWOOD, Calif. — If you're a Buck Rodgers fan, you'll be happy to know there's a computer behind everything he sees.

A Hollywood graphics consultant, Colin Cantwell, used a Hewlett-Packard Co. System 45 to create special effects for the television series pilot, "Buck Rodgers in the 25th Century," as well as other space fiction movies like "Star Wars" and "Close Encounters of the Third Kind."

Pictures are drawn on the desktop system's CRT terminal, printed on paper and then photographed. Using the photographic negative, the Buck Rodgers spaceship cockpit set can be transposed onto film, giving the impression that actors really are experiencing a space dogfight, Cantwell explained.

In addition to creating special effects, the System 45 helps behind the scenes. The planning of camera angles for animated space scenes is often a trial and error process.

With even short scenes taking hours — and sometimes days — to photograph, mistakes often make the process even longer.

Trajectory Input

Cantwell developed a program allowing him to input a model rocket ship's trajectory; the System 45 then outputs the camera angle and the type of lens that should be used.

If the operator wants to change or switch camera lenses, the software can compensate for the changes, according to Cantwell.

Colin Cantwell at Work

'Prewriting' a Must for Good Technical Prose

Ruth Schiff Winett

If computer people think logically, why do so many have difficulty organizing and recording their thoughts in a clear fashion?

This is the first in a series of 12 articles on better writing.

Reliance on computerese is not the reason that technical people have trouble writing. Nor is ignorance of spelling and punctuation the culprit. The main reason that people in general have trouble writing is that they seldom do enough prewriting.

Bad writers rarely have a writing destination in mind before they begin writing. As a result, they (or their readers) get hopelessly lost in a forest of words.

The six major steps to writing an article are formulating a statement of purpose, developing a thesis, brainstorming, organizing details, writing and rewriting.

Before writers begin to write, it is often useful for them to formulate a statement of purpose; for example, the purpose of this article is to help writers organize their thoughts before they begin to write. Phrases which may appear in such statements are "to inform," "to explain," "to describe," "to record," or "to prove."

The types of details or examples included in the paper will be governed by the purpose. It should be noted that the statement of purpose is implied but never actually included in the paper itself.

Thesis Statement

After writers articulate a purpose, they should then develop a thesis statement. This statement is a well-formulated sentence which expresses the main idea or gist of the paper. It is the paper reduced to its essence.

Writers might ask themselves, "What is the single most important idea for my readers to extract from this paper?" In the case of this particular article, the thesis is the following: The six main steps to writing an article are formulating a statement of purpose, developing a thesis, brainstorming, organizing details, writing and rewriting.

The thesis is different from the introduction which precedes it. The introduction is comparable to the panoramic view of Main St. in a western. The thesis is analogous to the view of the interior of Harry's Saloon or to the view of a passenger debarking from the newly arrived stagecoach.

Thus, the introduction (Main St.) sets the scene and the thesis (Harry's Saloon) informs the reader (viewer) of what the paper (movie) will be about.

Occasionally the thesis is withheld until the end of the paper. However, most readers don't appreciate the suspense, especially in longer papers.

The Brainstorming Phase

After writers have clarified their thinking enough to formulate a logical, well-constructed thesis statement, they are ready to brainstorm. Brainstorming is the widely applicable technique of rapid, nonjudgmental recording of all the ideas one has on any given topic (from "What strategies shall I use to get a raise?" to "What reasons shall I include to prove that we need another disk drive?").

At this point in the writing process, no details, however farfetched, should be excluded. For example, the initial list for this article included these topics:

- Parallel structure.
- Purpose.
- Thesis.
- Outlining.
- Brainstorming.
- Run-on sentences.
- Fragments.
- Writing.
- Rewriting.
- Dangling modifiers.
- Spelling.

It was immediately apparent that an initial article on writing should not include parallel structure, dangling modifiers or spelling (a special problem!). Thus, in the next stage of brainstorming, those three items were eliminated from the list.

Organizing Details

After writers have eliminated superfluous or peripheral items from their lists, they should then consider the sequence of the items. Outlining is recommended, especially in longer papers. Thus, the following skeletal outline emerged for this article:

I. Purpose
II. Thesis
III. Brainstorming
IV. Outlining
V. Writing
VI. Rewriting

Since all of these categories are broad, further brainstorming should be done for each item in the outline. The third section becomes:

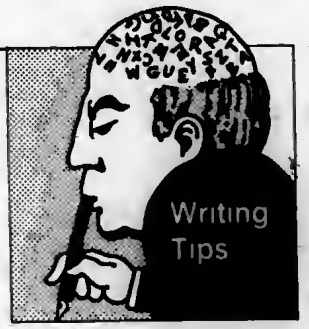
III. Thesis
  A. Contains main idea
  B. Follows introduction
  C. Indicates writer's stance
    1. Regarding subject
    2. Regarding audience

Rewriting becomes:

IV. Rewriting
  A. Check logic
    1. Outline again
    2. Look for inadequately developed points
    3. Eliminate irrelevant details
  B. Check paragraph structure
    1. Look for topic sentence
    2. Look for unity (one idea per paragraph)
  C. Check introduction and conclusion
    1. Is introduction attention-grabbing?
    2. Does conclusion restate salient points?
  D. Check sentence structure
    1. Correct run-ons
    2. Correct fragments
    3. Eliminate dangling elements
  E. Check grammar
  F. Check spelling and punctuation

Why is such detailed outlining advisable? Outlining forces writers to think through the development of their ideas before they write. Writing should not be attempted until the content of the beginning, middle and end of the paper are thought out.

Outlines have the additional advantage of indicating not only the sequence of ideas, but also their relative importance. Outlines with enough detail can also help writers determine logical divisions of ideas; this helps writers to determine when to begin new paragraphs.



In longer papers, outlines help writers avoid the repetition and omission of ideas.

Finally, outlining helps minimize the amount of cutting and pasting necessary in the rewriting stage. As a result, once writers have developed satisfactory outlines, they will find that the actual writing process has become greatly simplified.

Writing Techniques

There are two distinct writing techniques — some people write and revise as they proceed, others write and then revise later.

It is a matter of individual preference: however, it is extremely important to revise and put the finishing touches on papers. This sort of debugging separates outstanding writers from mediocre writers.

Just as programmers should not sit down at their terminals before having some objective in mind, writers should also not sit down to write without having a writing destination in mind. In formulating a statement of purpose and a thesis (and in brainstorming and outlining), writers do enough mental agonizing that the actual writing of the paper should be relatively easy. Additionally, the revising should also be simpler.

Technical people spend so much time on documentation and memo writing that managers should consider writing seminars for their employees. It would certainly be cost-effective if managers and programmers could improve their writing skills. After all, any programmer can . . .

Winett teaches Essentials of Writing at Framingham (Mass.) State College.

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Work Continuing on Nine-Digit Zip

By Don Leavitt
CW Staff

WASHINGTON, D.C. — The U.S. Postal Service is continuing to move toward an extended Zip Code — a move that some see costing DP installations as much as it may save the service.

First publicly discussed a year ago, the nine-digit Zip Code will be ready for use by 1983. The extended codes are intended to save the Postal Service money by simplifying its management of individual routes.

Each nine-digit Zip Code will apply to a particular address; with that fragmentation, carrier routes can be changed as often as needed, a Postal Service spokesman explained. The service still does not expect to announce the extended codes until early in 1981, but that is right on schedule.

In the meanwhile, rules for the assignment of the four digits added to the current five-place Zip Code are being proposed and evaluated. The basic concept is simple enough, but its application is difficult, according to the spokesman.

Each area now covered by a five-digit Zip Code has to be subdivided into pieces that can be indicated by the first two additional digits. Each of these subdivisions will then be splintered into as many as 99 locations, to be assigned as the final two digits.

Unfortunately, rivers and other geographic features tend to disrupt the orderly application of the concept. The service is currently running through internal tests to see how well the rules can be used.

These tests are being conducted in a number of cities, but do not affect the public, the spokesman said. Post Office employees are simply counting mail destined for target locations and seeing how the proposed nine-digit codes would work.

Until the extended codes are announced a year and a half from now, therefore, there appears to be little for the individual DP installation to do.

Despite the benefits it sees for itself, the Postal Service apparently recognizes the impact the extended Zip Code could have on businesses and their DP operations. The use of the longer codes will be on a voluntary basis, the spokesman said.

Almanac To Battle Post Office

By Tim Scannell
CW Staff

LEWISTON, Maine — Have you heard the one about the farmer and his nine-digit Zip Code? Well, there's a magazine here that hopes you never will.

With its 163rd edition, the *Farmers' Almanac* has launched a campaign against the U.S. Postal Service's planned implementation of an extended Zip Code in 1981. While promoters claimed that adding four digits to the present code will enable the post office to use optical character recognition (OCR) equipment more efficiently, cutting consumer costs and speeding deliveries, [CW, Oct. 2, 1978] *Almanac* maintained that the extra numbers would only make people "digit dizzy."

"People get frustrated with all the numbers thrown at them," *Almanac* editor Peter Geiger said, pointing out that postal authorities have informed him the additional numbers are for the benefit of the post office's overworked computers. "The current Zip Code has been accepted and people have done well to remember that many numbers, but . . . nine digits is just a bit much."

Championing 'Middle America'

Geiger is careful to explain that the *Almanac* is not critical of computers in general. In fact, the yearly weather and general information-packed magazine, which has a circulation of more than six million, uses a Honeywell, Inc. Series 60 Level 6 minicomputer to keep track of billing, payroll and other administrative duties.

However, the publication does decry the automation and computerization of what it calls "middle America."

"We cannot, we must not, be computerized," the recent issue of the *Almanac* stated. "Unfortunately, a mind has its limitations — we cannot handle the numbers the machines spit out, nor should we be expected to do so."

Geiger noted that letters, conspicuously marked with the five-digit Zip Code, have been pouring in, and he has received thousands of telephone calls congratulating the *Almanac* on its

(Continued on Page 16)

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More Than 120 Sessions to Be Developed

NCC '80 Scouting for Program, Feature Ideas

ARLINGTON, Va. — A call for participation has been issued for the 1980 National Computer Conference, to be held May 19-22 in Anaheim, Calif.

Everyone in the information processing field, including computer specialists and end users, is invited to write a paper, propose a technical or panel session, volunteer as a panelist or suggest special activities, demonstrations or conference features for the event. The program will include more than 120 sessions covering the broad areas of management, applications, science and technology and social implications.

"The program under development seeks to provide . . . state-of-the-art presentations by leading persons in the computing industry," according to Program Chairman Dr. Don B. Medley of Moorpark College in Moorpark, Calif. "The sessions will explore current issues, legal, social and technical; methodologies associated with hardware and software development and use; and management concepts related to the improvement of the computer service functions."

Suggested areas for participation in the realm of management include performance measurement and evaluation; recruiting, training and staffing; office automation; and project and program management techniques and systems. In the application field, suggested topics include computers in earth resource management, human services, computer graphics, artificial intelligence, electronic funds transfer (EFT) and point-of-sale (POS).

The subject of software will include discussion of programming languages, standards, validation, reliability, design techniques and methodology, quality assurance, image processing, and voice simulation and recognition. Hardware topics will include signal processing, telecommunications, distributed processing, networking, parallel processing, new concepts in memories, intelligent communications lines and distributed processor communication architectures.

As for social implications in computing, subjects will include earth resources, education, personal computing, privacy, security, professional standards and women and minorities in the computing discipline.

A miniconference presenting an in-depth review of the use of computers in the entertainment industry will be featured in the show. Miniconference sessions will treat the use of computers in art, sculpture, theatrical lighting, casinos, fairs and home entertainment.

In addition, the miniconference will cover computers in literature, movies, television, music, stage and sports.

The deadline for submissions is Nov. 1. Six copies of each paper ranging from 2,500 to 5,000 words should be submitted together with six copies of a title page containing a 150-word abstract, four to six key words describing the subject, the author's affiliation, telephone number and mailing address.

All suggestions, proposals and papers can be sent to Medley at Moorpark College, 7075 Campus Road Moorpark, Calif. 93021. Guidelines for conference paticipation are contained in the official "Call for Participation," available from the American Federation of Information Processing Societies headquarters, 1815 N. Lynn St., Arlington, Va. 22209.

IIA Meet Slated For Oct. 28-29

WASHINGTON, D.C. — "The Information Resource in the Post-Industrial Age" will be the topic of the seminar to be held Oct. 28-29 preceding the Information Industry Association's (IIA) 11th annual meeting.

Open to the information community at large, the seminar will address ways of harnessing information to increase productivity and ways of determining what information the government may or may not disclose.

Advance registration for the seminar costs $125 for IIA members, $175 for nonmembers and $75 for government and academic employees. The cost rises $25 at the door, except in the case of government employees, whose admission fee rises $15.

The IIA is headquartered at Suite 502, 316 Pennsylvania Ave. S.E., Washington, D.C. 20003.

Service Targets DDP Managers

PENNSAUKEN, N.J. — A reference service dedicated to distributed data processing (DDP) management has been announced by Auerbach Publishers, Inc.

"Distributed Data Processing Management," to be updated bimonthly, was designed to help the user plan, implement and manage a cost-effective DDP system, according to Auerbach.

The service can be examined free for 30 days, after which the examiner qualifies for a $20 discount off the regular price of $185.

Auerbach is located at 6560 N. Park Drive, Pennsauken, N.J. 08109.

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FAA Halts Widening of Controlled Airspace

By Marguerite Zientara
CW Staff

WASHINGTON, D.C. — Federal Aviation Administrator Langhorne Bond has withdrawn his proposal to expand the band of airspace subject to air traffic control (ATC), a plan that would have seriously taxed computer systems, some of which are already operating at over 85% of capacity.

The proposal, suggested late last year, sparked a wave of protest from air traffic controllers [CW, April 23], as well as from general aviation pilots. The Federal Aviation Administration (FAA) received more than 43,000 comments from the public, over 90% of which were opposed to the plan, according to an FAA spokesman.

The proposal, put together in the wake of the mid-air collision in San Diego last fall that killed 144 people, would have lowered the floor of the positive control airspace (PCA) from 18,000 feet to 10,000 feet east of the Mississippi River and in parts of California and to 12,500 feet over the Rocky Mountains.

The proposal also would have required pilots operating under visual flight rules (VFR) to file flight plans, maintain communications with air traffic control and adhere to ATC clearances and instructions when operating between 12,500 feet (or 10,000 feet) and 18,000 feet. Currently, only instrument flight rule (IFR) operations are subject to air traffic control in the airspace between 10,000 feet and 18,000 feet.

Memory 'Saturation' Cited

Air traffic controllers contended that many of the IBM 9020 series computers installed at the country's busiest airports are already operating at the point of memory "saturation."

Even without the added ATC responsibilities that would have resulted from the plan's expansion of the PCA, there are many documented instances of computers "going down" as a result of memory overload, thereby depriving controllers of alphanumeric information printed on their radar screens [CW, March 20, Nov. 6, 1978; March 26, June 18, 1979].

The alphanumeric information includes the airplane's ground speed, altitude, airline name, and flight number. While air traffic can be controlled with out alphanumerics, controllers claimed that when the data is lost, the subsequent disorientation momentarily increases the chances of a mid-air collision — the very thing the FAA's plan was supposed to prevent.

Bond said his decision to withdraw the proposal came after the FAA's review of public comment and its analysis of other related information, which indicated there might be "more effective alternatives" for achieving the agency's safety objective.

As part of his decision to withdraw the proposals, Bond said he has expanded the FAA's ongoing study of the nation's airspace. The study will involve increased consultation with airspace users and direct public participation.

While the FAA is presently trying to formulate new methods of avoiding mid-air collisions, a formal proposal may not be forthcoming for another two years, the FAA spokesman said.

Almanac Fights Zip Code Plan

(Continued from Page 14)

digital effort. A major weapon in his battle against the post office is the fact that lower costs and faster mail service were the main reasons for starting the original Zip project. He pointed out that since the time of the original project, first-class stamps have shot from about five-cents to 15 cents — and the speed of deliveries speaks for itself.

Another reason Lewiston has become the focal point of the Zip Code resistance is that, should the nine-digit policy begin in 1981, the town's Zip Codes would increase from one to 40. Just about every street in the area would have a Zip number of its own, Geiger noted.

Not First Time

Although the Postal Service may seem a formidable opponent to battle, the *Farmers' Alamanac* remains optimistic, both because of the level of support it has received and because this in not the first time the magazine has taken a stand against the Service. About five years ago, the post office wanted to replace the traditional town, state and delivery hour post mark with a simple number. However, Geiger and his publication opposed the move, initiated a letter-writing campaign to Congress and convinced the Postal Service to stick with what was popular.

"We had 30,000 letters from all over the world saying, 'Hurray, bring it back,' and the post office did bring it back when they found out that people really enjoyed seeing where their letters are coming from," Geiger said.

Unlike *The Old Farmer's Alamanac*, which relies on Dartmouth time-sharing to compile its weather forecasts, the Lewiston publication employs an astronomer in Florida to chart the weather patterns. Using a 19th century mathematical formula that is applied to sunspots, planet positions and the effect of the moon on the Earth, the astronomer supplies a two-year advance forecast Geiger claimed is from 80% to 85% accurate.

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New York Implementing Patient System That Fueled Controversy Over Privacy

By Ann Dooley,
CW Staff

ALBANY, N.Y. — A medical and financial information system is finally being implemented here after nearly a year of debate and compromise between civil libertarians, the state medical profession and the State of New York.

The system that sparked the controversy is the Statewide Planning and Research Cooperative System (Sparcs), which will act as a centralized management information system to provide hospitals and state and federal governments with fiscal and medical planning data.

Patient Information

Once the system is fully implemented, information on each patient entering any one of the state's 300 inpatient hospitals will be compiled on a standardized form and input into a Burroughs Corp. B6700 dual processing system located at the New York State Office of Health Systems Management.

Information to be reported will include the dates of admission and discharge, the procedure performed, insurance identification number, the patient's address and birth date and the hospital into which the patient was admitted, according to Joanne Quan, project director.

The Sparcs system is expected to be a model for the rest of the country and, in keeping with this, the U.S. Department of Health, Education and Welfare (HEW) has granted the state $4 million to finance the project. Once the system is in full operation, it will allow hospitals, planning committees and state and federal governments to examine hospital costs, set reimbursement rates, allocate limited resources and even help in identifying illness and death patterns, according to Quan.

Debates Sparked

Disagreement over the project arose when it was announced last year. Privacy groups contended that the system would invade patient privacy and encourage potential information abuse, while New York hospitals were concerned that the procedure would leave them open to lawsuits.

The system's implementation was postponed while project coordinators worked with the two groups to hammer out solutions to many of the problem areas. Project proponents have hailed the solutions as some of the most far-reaching safeguards against unwarranted invasion of the privacy of hospital information anywhere in the country, while former opponents have either been placated by the revisions or are still cautious in their praise.

Under the revisions, the patients will not be identified by name. Instead, a medical record number will be assigned; attending physicians will also be assigned a number. This will ensure the protection of a patient's identity so no identifying information will be input into the computer, Quan said.

Another major revision restricts the right of access to the data bank. Originally, the project allowed a law enforcement agency to override the rules of access if the agency could certify that the information was related to a potential prosecutable offense.

Same Review for All

Under the revised rules, all government agencies, individuals and organizations must undergo the same review process that every other group must undergo.

A Data Protection Review Board comprised of members from the general public will have the power to approve all information requests. Once a decision is made, the state health commissioner will examine the findings and make a final decision on whether to release the information. If the review board does not agree with that decision, it can override it by a two-thirds vote.

A revision made by the state to appease the New York State Hospital Association includes a form explaining to patients that the information is required by the state and not by the hospital, an explanation which the association feels will protect hospitals from possible lawsuits.

ACLU Not Happy

One group that is not yet completely satisfied with Sparcs is the Albany office of the American Civil Liberties Union (ACLU), which contends that the new regulations have no real legal basis since they were not enacted into law by the state legislature. If the government wants to examine the records, it will, an ACLU spokesman said.

No one has ever before had the capabilities of matching this kind of medical information with other computer systems, according to ACLU spokeswoman Sarah Birn.

The potential for abuse is there, she said, adding that there has never been a data system that hasn't grown in depth and magnitude once it was instituted.

In both the Project Match and the Parent Locator Systems, the federal government violated privacy statutes by using Internal Revenue Service and Social Security data — both of which had previously been sacrosanct from outside access, Birn charged. Although in Sparcs patients' names have been deleted, it still may be possible to merge the data to find out personal information, she warned.

Immediate Operation

The Sparcs project will begin operation immediately, and the coordinators expect the hospitals throughout the state to be on the system by the end of the year.

Sparcs will replace several individual systems used previously by hospitals. Although almost all of these were manual systems, the project coordinators expect the conversion to go relatively smoothly.

All the information will be sent to the computer site after the patient is discharged, and there it will be stored in a separate tape library until it is necessary to generate specific reports or studies.

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Calendar

Oct. 15-19, Toronto — **Forum/8: International Conference.** Contact: Forum, 4300-L Lincoln Ave., Rolling Meadows, Ill. 60008.

Oct. 15-19, San Diego — **15th Meeting of the Computer Performance Evaluation Users Group,** sponsored by the National Bureau of Standards. Contact: Judith G. Abilock, The Mitre Corp., Metrek Division, 1820 Dolly Madison Blvd., McLean, Va. 22102.

Oct. 19, Chicago — **The Integration of Corporate Economics Into the Strategic Planning Process.** Contact: Barbara Benson, Social Systems, Inc., 300 Eastowne Drive, Chapel Hill, N.C. 27514.

Oct. 22-24, Colorado Springs, Colo. — **51st Management Conference,** sponsored by the Association of Data Processing Service Organizations (Adapso). Contact: Adapso, 210 Summit Ave., Montvale, N.J. 07645.

Oct. 22-26, Woburn, Mass. — **Pascal Programming Workshop,** sponsored by the Polytechnic Institute of New York and the Institute for Advanced Professional Studies. Contact: Donald D. French, Institute for Advanced Professional Studies, One Gateway Center, Newton, Mass. 02158.

Oct. 24, New Haven, Conn. — **A View From the Top — Closing the Loop.** Contact: Xerox Computer Services, 2 Pickwick Plaza, Greenwich, Conn. 06830.

Oct. 29-31, Tampa, Fla. — **Decision 1980: Meeting the End-User Challenge.** Contact: Real Decisions Corp., 123 High Ridge Road, Stamford, Conn. 06905.

Oct. 30-31, Washington, D.C. — **Information Industry Association (IIA) Annual Meeting.** Contact: IIA, Suite 502, 316 Pennsylvania Ave., Washington, D.C. 20003.

Oct. 30-Nov. 1, Anaheim, Calif. — **Interface West: Conference and Exposition for Small Computer, Word Processing and Other Office Automation Systems,** sponsored by Interface West and Datamation Magazine. Contact: Interface West, 160 Speen St., Framingham, Mass. 01701.

Oct. 31-Nov. 2, Des Plaines, Ill. — **Telecommunications — Today and Tomorrow,** sponsored by the Chicago Industrial Communications Association (Cica), Michigan-Ohio Telecommunications Associations, Minnesota Communications Association, Mississippi Valley Telecommunications Association and Wisconsin Telecommunications Association. Contact: Bob Hagglund, Executive Secretary, Cica, 1905 W. Leland, Chicago, Ill. 60604.

Nov. 1, Cherry Hill, N.J. — **Invitational Computer Conferences.** Contact: B.J. Johnson & Associates, Suite 203, 2503 Eastbluff Drive, Newport Beach, Calif. 92660.

Nov. 3, Wichita, Kan. — **Optical Scanning for Data Entry.** Contact: Association for Educational Data Systems, 1201 16 St. N.W., Washington, D.C. 20036.

Nov. 5-6, New York — **Understanding Data Communications Network Components.** Contact: McGraw-Hill Conference Center, Room 3677, 1221 Ave. of the Americas, New York, N.Y. 10020.

Nov. 5-7, Boston — **DP Training Administrator's Workshop.** Contact: Ware Associates, 38 Main St., Hudson, Mass. 01749.

Nov. 5-7, Los Angeles — **Annual Electronic Data Processing Institute.** Contact: International Foundation of Employee Benefit Plans, 18700 W Bluemound Road, P.O. Box 69, Brookfield, Wis. 53005.

Nov. 5-7, Washington, D.C. — **Managing the Electronic Office.** Contact: Office of the Future, Inc., 7002 Blvd. East, Guttenberg, N.J. 07093.

Nov. 5-8, Chicago — **Third International Computer Software and Applications Conference (Compsac '79).** Contact: Compsac '79, P.O. Box 630, Silver Spring, Md. 20901.

Nov. 6-8, Chicago — **Midcon '79 Electronic Convention and Exhibition.** Contact: Midcon, P.O. Box 92275, Los Angeles, Calif. 90009.

Nov. 6-8, Washington, D.C. — **Federal Computer Conference.** Contact: Federal Computer Conference, P.O. Box 308, Wayland, Mass. 01778.

Nov. 7-9, Boston — **DP Instructor's Workshop.** Contact: Ware Associates, 38 Main St., Hudson, Mass. 01749.

Nov. 7-9, San Antonio, Texas — **National Micrographics Association Midyear Meeting.** Contact: John B. Bidwell, 8728 Colesville Road, Silver Spring, Md. 20904.

Nov. 7-9, Los Angeles — **Introduction to Teleprocessing Software.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Nov. 28-30 in Washington, D.C.

Nov. 7-9, Washington, D.C. — **Distributed Systems: Are They Right for You?** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 7-9, Washington, D.C. — **Data Base Management Systems: General Concepts and Planning Guidelines.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Nov. 28-30 in Los Angeles.

Nov. 7-9, Los Angeles — **Data Processing: An Introduction to Concepts and Systems.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 7-9, Los Angeles — **Effective Computer Operations Management.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Nov. 28-30 in Dallas.

Nov. 7-9, Chicago — **Word Processing: Effective Operations Management.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Nov. 28-30 in San Francisco.

Nov. 7-9, Chicago — **Integration of Word Processing and DP Systems.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Nov. 28-30 in Washington, D.C.

Nov. 7-9, Atlanta — **Online '79 Conference and Exposition.** Contact: Online '79, 11 Tannery Lane, Weston, Conn. 06883.

Nov. 7-9, Tarpon Springs, Fla. — **International Telecommunications Forum.** Contact: Arthur D. Little, Inc., Acorn Park, Cambridge, Mass. 02140.

Nov. 8, Los Angeles — **Western Systems Conference,** sponsored by the Association for Systems Management. Contact: Sylvia Twomey, Apt. 47, 18700 Yorba Linda Blvd., Yorba Linda, Calif. 92686.

Nov. 8-9, Chicago — **Data Communications: Advanced Concepts and Systems.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 9-11, Chicago — **Small Business and Consumer Computer Expo.** Contact: Louise Garcia, 1453 Rio Rancho Drive S.E., Rio Grande, N.M. 87124.

Nov. 12, Chicago — **DP Performance Management.** Contact: Applied Computer Research, P.O. Box 92068, Phoenix, Ariz. 85068.

Nov. 12-14, New York — **DP Productivity Improvement Workshop.** Contact: Johnson Systems, Inc., 7923 Jones Branch Drive, McLean, Va. 22102.

Nov. 12-14, New York — **Microprocessors in Systems Design.** Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

Nov. 12, Chicago — **Computer Management in the '80s: Senior Executive Overview.** Contact: Computer Power Management Corp., Box 1403, Rockville, Md. 20850.

Nov. 12-14, Los Angeles — **Data Communications: An Introduction to Concepts and Systems.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 12-14, Chicago — **Data Communications: Effective Network Design.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Nov. 28-30 in New York.

Nov. 12-14, San Francisco — **Data Base Management Systems: A Comparative Analysis of General-Purpose Systems.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Nov. 28-30 in Washington, D.C.

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COMPUTERWORLD

DPMA Conference, Exhibit Set for Oct. 14-17

SAN DIEGO — A session on emerging trends in hardware and software will highlight the Data Processing Management Association's (DPMA) international conference and exposition here Oct. 14-17 at the Town and Country Hotel.

The session, to be held Tuesday, Oct. 16, will be presented by Dr. Ulf Fagerquist, manager of research and advanced development at Digital Equipment Corp.

Other session speakers include Dr. Harold Fleisher, an IBM fellow; Dr. Efrem Mallach, Honeywell, Inc.'s manager of technical support; and Dr. John Poduska, vice-president of engineering and programming at Prime Computer, Inc. The sessions will be moderated by Dr. Norman Sondak, professor and chairman of the Information Systems Department at San Diego University.

Seminar presentations constitute a large part of the conference program of more than 40 sessions. Among these presentations are "Writing Skills for DP Professionals," "Rehearsing the Future: Long-Range Planning and the Strategic Management Process," "How to Handle Stress and Techniques for Improving DP Staff Performance" and "Pragmatic Personal Time Management."

Other seminar topics include "Coming Impact of the Microcomputer," "Prepackaged Software for Small Business Systems" and "Source Data Processing — A Realistic Method for Managing a Decentralized Business."

The conference will also feature topical seminars on privacy considerations in information systems, computer output on microfilm, interactive graphics, networks and data communications and legal aspects of DP management.

In addition, equipment will be displayed by a variety of manufacturers including IBM, Control Data Corp., Datapoint Corp., Decision Data Computer Corp., Nixdorf Computer Corp., Pansophic Systems, Inc. and others, according to the DPMA.

More information on the conference is available from the Conference, Coordinator, DPMA International Headquarters, 505 Busse Highway, Park Ridge, Ill. 60068.

In another development, Ardyn E. Dubnow, DP manager of the Electronics Division at Northrup Corp. in Norwood, Mass., was recently appointed an official DPMA representative to the newly created X.12 standards committee of the American National Standards Institute (Ansi).

The X.12 committee will review business-to-business transactions, and standards will be created for the processing and formatting of documents such as purchase orders, invoices and billing notices, the DPMA said.

Call for Papers

INSTRUMENTATION FOR PEOPLE/1980 Bloomington, Minn April 30-May 2 1980

Sponsored by the Food Industries Division and the Water and Wastewater Division of the Instrument Society of America, the conference seeks papers in the following categories water and wastewater — application for microprocessors and programmable logic controllers, economics of automatic control and energy management new concepts in distributed processing and telemetry control systems for solids handling and disposal experiences with on-line analytical instrumentation and new concepts for making physical measurements also in food industries — the application of microprocessors to CIP systems instrument maintenance and calibration with on-line control, developments in analytical measurement for moisture density and/or turbidity and control valves of sanitary design for use with viscous products

Abstracts should be sent as soon as possible For more information about presenting a paper on a wastewater topic contact Raymond L Price Metropolitan Waste Control Commission, 3250 Plant Road St Paul Minn 55122 For more information about papers on a food industry topic contact Rodney A Howell, Ivybridge Taylor 420 Excelsior Ave. E Hopkins, Minn 55343

SECOND NATIONAL EDUCATIONAL COMPUTING CONFERENCE (Neccc'2) Newport News Va., June 23-25, 1980

Sponsored by 15 professional organizations Neccc'2 will stress the practical use of computers in education and will hopefully lead to documentation of the status of computers in education in the U S

Papers are sought from people in all academic disciplines and research areas and may cover such topics as computer science, engineering and information systems education, computer usage in the physical sciences social sciences and humanities and state and federal programs related to computers in education

Papers describing actual experiences with computer use in the classroom are invited They should report concrete results or be survey or tutorial papers including a synthesis and evaluation

One Jan 15 paper should be submitted as an original and four copies, typewritten double-spaced and not exceeding 15 pages They should be sent to Prof Richard Nunning Computer Science Department University of Maryland College Park Md 20742 Notification of authors will be about March 1

ADVANCED SEMICONDUCTOR EQUIPMENT EXPOSITION (Asee) San Jose Calif Jan 22-24 1980

Technical papers relating new or advanced techniques developed to cope with the country's sagging economic posture by increasing productivity are now being solicited by the conference committee Papers should address the following topics crystal growing wafer fabrication mask making/circuit design/mask alignment wafer during techniques, assembly, packaging and testing/QA

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Mail abstracts to Asee Conference Chairman, Suite 1014 401 Macara Ave Sunnyvale Calif 94086

SEVENTH ANNUAL CONFERENCE ON COMPUTER GRAPHICS AND INTERACTIVE TECHNIQUES (Siggraph 80) Seattle WA July 14-18 1980

Sponsored by the Association for Computing Machinery (ACM) Siggraph 80 will focus on computer graphics research and development innovative applications and system management In area of research and development suggested topics include low-cost graphic displays, graphics algorithms surface representation and human interactions

Paper and panel session application topics can be submitted in such fields as architecture/engineering medical sciences animation/dynamics, natural/social sciences and data base management

A 300-word abstract of each paper should be submitted by Nov 5 the first draft with figures will be due Dec 3 and authors will be notified by March 15

Authors wishing their papers to be considered for publication in the Communications of the ACM must indicate that upon submission of paper

Panel proposals should include topic abstract panel moderator and suggested panelists

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EDITORIAL

The Latest on Salaries

As with most things, there's both good news and bad news for DP management in the recent Fox-Morris survey of salaries in the computing profession.

It is good news, of course, that salaries at all levels seem to be running at record levels for all classes of DP personnel.

But there are also several ill tidings in the results. First, an incredible demand for people may be pushing salary levels up unrealistically. This huge demand can lead to job hopping — particularly among lower level personnel just moving up the ladder — and create major headaches for the average installation. Rapid turnover means more time training and documenting work in a shop.

At the same time, the survey shows that the largest percentage gains for DP personnel were in the entry-level areas — with entry-level B.S. graduates getting 29% more in 1979 than in 1978 and entry-level M.B.A. grads receiving 11.1% more this year than last.

Such large increases put pressure on the entire organization to upgrade all along the line. After all, a programmer with three years' experience may not be making that much more than the entry-level trainee if the entry-level positions continue to show such huge increases.

Faced with these pressures — high demand and short supply — many DP managers throw up their hands in despair and just pay the price necessary to attract and hold good people.

But there are some things that managers can do to help retain personnel. For example, DP managers should consider some nonmonetary rewards. Some shops find that flextime, for example, allows them to retain personnel that don't like to be tied down to specific hours. In other cases, some DP organizations have tried three-day weeks with employees working 12-hour days and then receiving four consecutive days off.

Not all of these types of programs will fit every organization, but DP managers should take a close look at the possibilities for their specific operating conditions.

One thing appears to work fairly successfully, however. Strong on-the-job training programs for personnel seem to cut the turnover rate among the trainees [CW, Sept. 10].

With the job market tight, DP managers need to investigate all possible methods for retaining personnel.

DATA PAST

Five Years Ago
Oct. 2, 1974

WASHINGTON, D.C. — The rising chorus of alarm against IBM's plan to buy a controlling interest in CML Satellite Corp. grew to a crescendo as a number of organizations in the computer and communications industries submitted comments and protests to the Federal Communications Commission. IBM's efforts during the summer to play down its proposal as a minor step appeared doomed to failure.

— — —

WASHINGTON, D.C. — The Board of Elections here ordered all ballots hand counted when an inaccurate vote tally in one ward cast doubt on all computer tabulations of the Sept. 10 mayoral and city council primary elections. Both hardware and software malfunctions on a Control Data Corp. 1700 combined to delay final election totals more than 22 hours after the polls closed, and the hand count indicated equipment and programming problems may have rendered many of the tallies inaccurate as well.

Eight Years Ago
Sept. 29, 1971

After months of rumors, RCA's Sept. 17 announcement that it had decided to get out of the computer mainframe business was not a complete surprise. But the fact that RCA made the announcement before knowing how or when it would carry out the decision upset a lot of people — especially RCA users. RCA pledged to meet "contractual commitments," but no one in the corporation seemed to know how this would be accomplished.

— — —

INDIANAPOLIS — If one agency is going to computerize a person's criminal history, it should be "an independent agency — not the police, not the department of corrections and not the courts," according to Dr. Jeffrey Schrink, director of research at the Indiana Department of Corrections. An "overall agency" is needed for this type of record system, Schrink said, because "that's the only way" the interests of all three users can be met.

LETTERS

Unix Outstanding

The article about the Association of Data Processing Service Organizations (Adapso) acting against Bell sales of software [CW, Sept. 10] has prompted me to write. I have no knowledge of the case or of Ma Bell's computer business practices and therefore will not comment on them, but some comments on the software itself seem appropriate.

I have not had hands-on experience with the Unix operating system, but I have read several books which describe aspects of it including the detailed report in the *Bell System Technical Journal* and *Software Tools* by Kernighan and Plauger. The Unix system, quite simply, is the only truly good operating system I have ever seen. It is written by professionals to be used by professionals.

Unix is well conceived, expertly executed and easy to understand and use. Most of the code is written in the excellent high-level language, C. The system makes program development easier instead of causing difficulties for programmers to overcome.

By comparison, all IBM products are so bad that in a free market environment no one would use the IBM crap. IBM software can be characterized by excessive amounts of meaningless documentation and high levels of complexity that make the use of the software ridiculously difficult. Unix, on the other hand, is simple and well documented. Simplicity makes Unix a much more powerful tool than any IBM product.

I am surprised that I have seen almost no mention of Unix or the C language in *Computerworld*. I am also surprised that CW does not take a stand against the kind of stuff IBM sells as software.

Richard E. Hessel
Cincinnati, Ohio

Burroughs in Israel

"Burroughs Declining in Israel as Customer Defections Grow" [CW, Aug. 6] was incorrect on a number of points.

Contrary to the report, over the last year our customer base in Israel has increased considerably. We have multiple orders for small, medium and large computer systems as well as a large quantity of terminal and peripheral equipment. We have recently won top awards in Burroughs Corp. worldwide sales contests as a result of these successes.

B1800 users are not selling their systems. Some B1700s will be for sale because users have upgraded to B1800s.

The service bureau quoted as "dropping plans to upgrade its medium systems to a B6800" has changed the order to two B3900 medium-scale systems. The other service bureau, representing Perkin-Elmer Corp., is well satisfied with the B1800 which was installed this July.

The printer at Israel Discount Bank, which was allegedly idle for six months after delivery, has been working satisfactorily since the day of installation and has been in constant use since then. A decision was made to redesign certain Hebrew characters and this required the manufacture of additional printing slugs which have already been delivered. Currently there are five such printers operating at various customer locations and further orders are awaiting delivery.

The "other bank" referred to continues to use Burroughs equipment. Furthermore, we are discussing expansion of DP needs with this customer.

Readers should know that the so-called "defector" is a very loyal Burroughs user and has ordered a B3950.

Menachem Gutterman
Managing Director
Clal Systems Ltd.
Tel Aviv, Israel

HUMAN CONNECTION/Jack Stone

Winning Over the Users: Press the Hot Buttons

Several weeks ago, I committed a cardinal DP writing sin.

Here was the situation: I was assisting a customer in preparing a major presentation on a new and complex system. The goal of the briefing was to acquaint senior, nontechnical executives with the system's capabilities and benefits and position it with respect to its predecessor and successor systems.

As most of you know, these presentations are always challenging to the developer because he must both educate and influence the decision maker in a relatively few minutes. And, as many of you also know, a large number of these presentations "flop" because of "poor communications" of the material — and all that expression connotes.

I was working on the nth iteration of the draft narrative when my customer said, "Hey, do you know what's missing here? We need some summary slides on how the system operates from the point of view of the user manager."

I covered up my embarrassment with a nervous smile because I really knew better. I had been looking at the bark of the trees with a microscope and completely missed the forest.

Years and years ago I learned about the use of the "operating concept" in executive briefings when I was employed in the systems planning department of a large military systems contractor. Our job was to develop total systems ideas — dealing with weapons, defense, surveillance, etc. — and merchandise them to various federal agencies to obtain funding for systems feasibility studies.

The boss of the department was a master in the art of taking systems concepts, designing winning proposals around them and building exquisite presentations to convince government officials to fund our systems studies. As a neophyte systems analyst, I was awestruck by this fellow's competence.

From the standpoint of communicating systems concepts to users, one project stands out in my memory above all others.

Our group was assigned the responsibility to head a corporatewide effort to prepare a proposal for an airborne weather reconnaisance system. The system idea was based on a manned tanker aircraft which was converted into a complete weather station and jammed full with all the latest meteorological technology that could be dragged kicking and screaming from American industry.

During its mission, the aircraft was supposed to pick weather information from all sorts of sensors, including rocketsondes and dropsondes, and send it back to ground stations, via data links, for follow-on processing.

Well, the system was replete with subsystems and subsubsystems and subsubsubsystems, and I didn't see how in the world we could cram all that material into a 45-minute presentation and make it meaningful.

The answer is, you don't, said the master. Instead, you run the audience through a typical operational day.

Because of the significance of the project, he handled the design of the briefing himself.

Well, I didn't have a chance to see his slide package until after he and his team returned from the briefing session, all happy and smiling. And I soon realized why they felt so good about it. The communications were

(Continued on Page 30)

READER COMMENTARY/ Larry M. Singer

Program Upkeep Costs Can Be Cut

Of all the continuing problems faced by a production-oriented DP department, the high cost of program and system maintenance must be one of the most frustrating.

The DP manager must explain to his vice-president why more than half his programming budget is devoted to maintenance; the programming manager must tell the accounting department that adding two new fields to the accounts payable master file may take at least two months; the operations manager must warn his staff to expect the usual problems when the next maintenance change goes into production; and the programmer who actually does the work must ask himself what he did wrong to deserve another thankless maintenance task.

Perhaps with the new techniques and procedures such as top-down design and structured programming the application systems of the future will not require the continual maintenance that most of our current systems need. But this comforting thought does not help the DP shops who have systems written five or 10 years ago and now spend 50% to 75% of their programming effort just maintaining those systems.

Yet there are ways to reduce the high cost and problems associated with program maintenance, if DP management is willing to take steps to minimize those boring and repetitious aspects of maintenance that programmers have been complaining about for years.

Analyzing System Changes

The first step is to examine the number and type of maintenance changes that occur in each application system. If your programmers are making changes every week to production programs, it is time to evaluate those maintenance needs and possibly come up with a better way to handle those user requests.

Data in a system can be manipulated in ways other than by coding changes. Perhaps a new transaction or the use of a control card might be the answer. For example, if the auditors required monthly dumps of payroll transaction files, they could easily input a new transaction or control card rather than depend upon the programming staff to turn on a switch to create those dumps.

The general principle should be to transfer as much control over the system to the user, instead of the programmer, as is practical and safe.

The second way to reduce the cost of program maintenance is to realize that program and system maintenance requests are rarely unique within an application system. For example, over the 10-year lifespan of any given system there may be seven requests to add data fields to a master file. Or there may be 20 requests to convert certain part numbers to a new department.

In most situations, the programmer or systems analyst assigned to the project will first create a list of changes that are needed to accomplish the request. Depending upon how familiar he is with the system, the programmer may require hours or even days to create that task list. He will typically scribble the list on the back of a used Cobol coding form which will disappear when the maintenance change is complete. Six months later when the next programmer is assigned the same type of task, he will also spend hours or even days developing that same list of steps. No wonder some maintenance tasks take so much time!

The solution is to develop a "maintenance book" that lists each type of change that has been applied to a system and the individual steps needed to accomplish it. Such documentation, which will probably be one typed page or less, should save significant amounts of time for any change that has been performed in the past.

Painful Modifications

The third way is to analyze why programmers have such a hard time modifying someone else's program. In some cases, a change to a program could take more man-hours than it took to write the programs in the first place.

Obviously, many of today's application programs were not written with future maintenance requirements in mind. As a result, today's maintenance programmers are faced with programs that are difficult to read, hard to understand and almost impossible to modify.

Because of this situation, programmers are usually told (or learn by bitter experience) to make as few modifications to a program as they can while doing maintenance tasks. It is certainly safer to leave the coding alone unless it

(Continued on Page 20)

THE TAYLOR REPORT/Alan Taylor

'Nodal Programming' Idea Coming to Micro Network

A few weeks ago this column dealt with the potential impact of nodal facilities on the concept of programming [CW, Sept. 17]. It contended that programmers will soon be able to program a network, and that their code will be run on a network, rather than on any one particular system.

Nodal programming makes it practical for a programmer to use different and more powerful facilities and tools for testing programs as well as for compiling them. Nodal operations permit the most economical use of a network, since there is no concern as to where the programming was originally performed or whether the operational system could also compile and test the programs.

This week, a different type of network — at the opposite end of the scale — is being considered. This network is based on personal computers such as Apples and Radio Shack TRS-80s and is backed up by a score of Digital Equipment Corp. systems in one place.

The particular network is the Compuserve, Inc. Micro-Net system. Compuserve is a good-sized traditional supplier of remote computing services, with telephone lines in scores of cities primarily in the Northeast.

Compuserve is traditional in more than one way. It cannot persuade its customers to use the systems in evenings and on weekends. It therefore has excess capacity during these periods, both on leased lines and on systems.

Micro-Net is quite a traditional answer to the marketing problem. Many personal computers are used more during the evening and weekend periods than they are during the day. This match of users to unused facilities attracted Compuserve, which has set about providing the necessary software and facilities to help this new market.

In addition to standard facilities such as bulletin board and message directions, Compuserve also provides some nonstandard facilities such as a new software marketplace where programmers can sell their wares to the Micro-Net users.

Compuserve is also preparing special software to ship files easily from the central computers to users. It is starting to tailor its services to the environment of its computer-owning customers, very much as you would expect.

The way the Micro-Net environment is currently being handled is really by converting the user's system into a terminal — and not such a very intelligent terminal, either — while it is connected to the network. John Meier, Compuserve director of corporate communications, argues that the advantage is the ability of the personal computer user to have access to the powerful facilities

(Continued on Page 30)

Users Shouldn't Avoid All Cobol GOTOs . . .

READER COMMENTARY/Pacifico A. Lim

Jack M. Wolfe's "What Ever Happened to PL/I?" [CW, Aug. 27] discussed a study on the choice and use of various programming languages to implement a problem. One major area of discussion was the use or avoidance of GOTO by the various programmers who participated in the study.

The problem used in the study is very simple (See Figure 1). Node L1 is an IF-THEN-ELSE construct which has a sequence construct for the true condition and a sequence construct followed by a dowhile constuct (Node L2) for the false condition. Node L3 is independent of the two other constructs and is a sequence construct.

Thus the problem consists of the three basic constructs of structured programming. The solution in Cobol is shown in Figure 2. It does not contain any GOTO.

However, the question still arises: Is PL/I really superior to ANS Cobol because of its inherent capability to implement structured programs easily? My answer is, "No!" Present implementation of ANS Cobol also gives the programmer the facility to write programs that are easy to read and maintain. A good Cobol programmer does not have to take a back seat to a good PL/I programmer to write programs that solve programming problems in commercial installations.

It is beyond the scope of this article (it takes a whole book) to fully explain how the Cobol programmer can write easy-to-read programs. I will deal mainly with the use of GOTO in Cobol.

When GOTO-less programming was espoused as an idea, initial testing on how it could implement structured code was conducted using Algol and PL/I. When these tests were successful in the implementation of algorithms and simple programs, this was taken as enough proof that GOTO-less programming was indeed the only way to go.

Although Cobol was also used later on, such tests were never made on complete Cobol programs of the kind normally written in the "real world" or commercial installations where programs may, among other things, have to sort files before processing, bypass records in an input file or terminate the execution of a paragraph under certain conditions.

My experience in the field is that GOTO-less programming in Cobol is unrealistic and rather romantic. However, this does not mean that the programmer can use GOTOs indiscriminately. Indeed, the three constructs of structured programming should be used along with other good techniques that result in easy-to-read programs.

The use of PERFORMs over GOTOs in a batch environment to execute a section or paragraph does not, however, make GOTOs obsolete.

There are four situations where the programmer may conveniently use them without compromising the readability of the program. These are: in the case of the performed section; a GOTO to bypass part of a paragraph to reach an exit; a GOTO to the beginning of the same paragraph; the DEPENDING ON option of GOTO.

The rule is to avoid GOTOs if their use will compromise the readability of the program.

The Performed Section

Any section that is being performed, as for instance the input or output procedure of the SORT statement, should be coded in a structured manner just like the rest of the program. The best way to code a performed section to implement structured programming is to have the first paragraph of the section control the processing of the whole section. Thus this paragraph must perform the following major functions:

1. Open all files to be processed in the section.
2. Perform initial read of the input files.
3. Do a PERFORM-UNTIL of a processing paragraph until the end of the input files.
4. Close all files completely processed in the section.
5. Exit from the section.

When the program has finished processing the input files in that section, the files are closed and the section must be terminated. To prevent control from falling through to the second paragraph when the first paragraph is finished, a GOTO statement is coded as the last statement of the first paragraph to force the exit of the section.

The object of the GOTO statement is an EXIT paragraph just before the next section or the last statement of the source deck. *Ironically, this GOTO statement will keep the coding of the section structured.*

Let us use this principle in an input procedure for a Cobol sort operation. Let us read a file and extract part of each record and sort them. The result is shown in Figure 3.

To Beginning of Paragraph

A GOTO to the beginning of the paragraph can used when certain records in an input file have to be bypassed for a particular run. For instance, a report to be prepared may require data only from sales records from a file that also contains credit records (naturally, other programs may use both record types).

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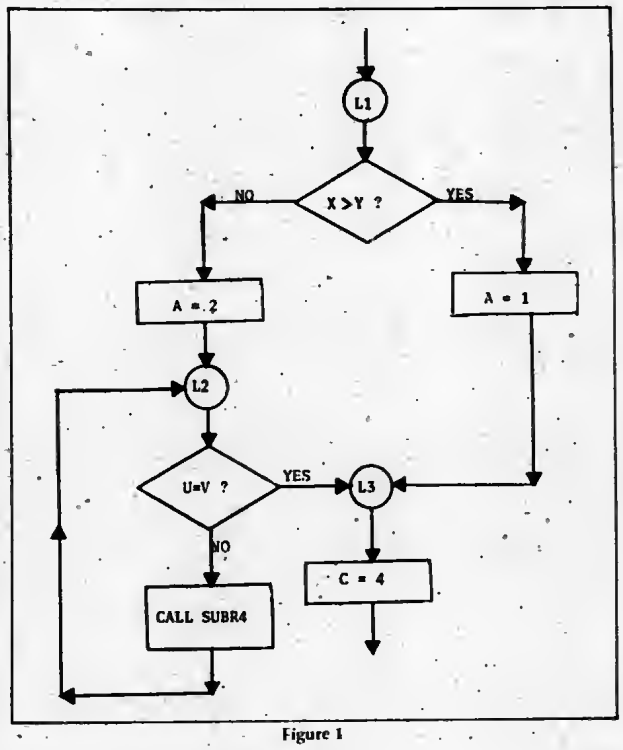

Figure 1

```
IF X IS GREATER THAN Y
THEN MOVE 1 TO A
ELSE MOVE 2 TO A
 PERFORM CALL-SUBR4 UNTIL U IS EQUAL TO V.
MOVE 4 TO C.
.....
.....
CALL-SUBR4.
.....
```

Figure 2

```
READ-TRANS.
  READ TRANS-FILE INTO TRANS-WK-RECORD;
   AT END, MOVE HIGH-VALUES TO TRANS-KEY.
  IF TRANS-KEY NOT EQUAL TO HIGH-VALUES
  THEN IF NOT SALES-RECORD
   THEN GO TO READ-TRANS.
```

Figure 4

The best and most convenient way of doing this is to bypass these records in the paragraph where the file is read. The implementation is shown in Figure 4.

To Paragraph End

A GOTO to the paragraph exit is used when we process a master file and want to select records in that file, but the selection criteria are not in the record and can only be determined after a table look-up.

For instance, a master file of sales records may be sequenced by department numbers. However, we want to process only the departments that belong to certain divisions. To make such groupings of departments into divisions flexible, the division code is not present in the master file but it is maintained as a table in an on-line file that may be updated by the user independently of the master file.

Then, if there is a need to get the division code for a particular master record, the division table is loaded into the program to be used for a table look-up using the department number of the master record. (See Figure 5.)

Here we assume that DIV-NO for a given record is determined from a table search operation using MASTER-DEPT (the department number), which is a field in the master record. When DIV-NO as determined from the search is greater than a certain value, we want to bypass the record. Naturally, we also want to bypass all other records with the same department number.

The observant reader may have noticed that the GOTO statement could have been avoided by using the ELSE clause. But since the use of GOTO is very clear in this case, why bother? (remember: we avoid GOTO if its use will compromise the readability of the program).

Second, if the statements to process the master record are extensive and contain several IF-THEN-ELSE constructs in the middle of the code, under

(Continued on Page 26)

```
REFORMAT-THE-TRANS SECTION.
  OPEN INPUT TRANS-FILE.
  PERFORM READ-TRANS.
  PERFORM REFORMAT-PROCESS UNTIL TRANS-KEY EQUAL
HIGH-VALUES.
  CLOSE TRANS-FILE.
  GO TO REFORMAT-EXIT.
REFORMAT-PROCESS.
  MOVE TRANS-KEY TO SORT-KEY.
  MOVE TRANS-DATA TO SORT-DATA.
  RELEASE SORT-RECORD.
  PERFORM READ-TRANS.
READ-TRANS.
  READ TRANS-FILE INTO TRANS-WK-RECORD;
   AT END, MOVE HIGH-VALUES TO TRANS-KEY.
REFORMAT-EXIT. EXIT.
```

Figure 3

```
.....
PERFORM PROCESS-MASTER THRU PROCESS-MASTER-EXIT
 UNTIL MASTER-DEPT EQUAL TO HIGH-VALUES.
.....
.....
PROCESS-MASTER.
  MOVE MASTER-DEPT TO OLD-DEPT.
  PERFORM SEARCH-FOR-DIV-NO.
  IF DIV-NO IS GREATER THAN DIV-MAX
  THEN PERFORM READ-MASTER
   UNTIL MASTER-DEPT NOT EQUAL TO OLD-DEPT
   GO TO PROCESS-MASTER-EXIT.
.....
(process the master)
.....
PROCESS-MASTER-EXIT. EXIT.
READ-MASTER.
  READ MASTER-FILE INTO MASTER-WK-RECORD;
   AT END, MOVE HIGH-VALUES TO MASTER-DEPT.
```

Figure 5

```
VALIDATE-DATA.
  MOVE ZEROES TO ERROR-CNT.
  MOVE SPACES TO ALL ERROR MESSAGE POSITIONS.
  IF FIRST FIELD IS IN ERROR
  THEN ADD 1 TO ERROR-CNT
   MOVE FIELD ERROR MESSAGE
    TO MESSAGE POSITION (ERROR-CNT)
   IF ERROR-CNT EQUAL TO ERROR-MAX
   THEN GO TO VALIDATE-DATA-EXIT.
  IF SECOND FIELD IS IN ERROR
  THEN ADD 1 TO ERROR-CNT
   MOVE FIELD ERROR MESSAGE
    TO MESSAGE POSITION (ERROR-CNT)
  IF ERROR-CNT EQUAL TO ERROR-MAX
  THEN GO TO VALIDATE-DATA-EXIT.
  .....
  .....
  IF TWENTIETH FIELD IS IN ERROR
  THEN ADD 1 TO ERROR-CNT
   MOVE FIELD ERROR MESSAGE
    TO MESSAGE POSITION (ERROR-CNT).
VALIDATE-DATA-EXIT. EXIT.
```

Figure 6

```
000500 PROCESS-TRANSACTIONS.
000510     GO TO PROCESS-TC1  PROCESS-TC 2  PROCESS-TC3
                DEPENDING ON TRANS-CODE
000530     GO TO PROCESS-TC-ERROR
000540 PROCESS-TC1.
000550     ....
000560     ....
000570     GO TO PROCESS-TRANS-EXIT.
000580 PROCESS-TC2
000590     ....
000600     ....
000610     GO TO PROCESS-TRANS-EXIT
000620 PROCESS-TC3
000630     ....
000640     ....
000650     GO TO PROCESS-TRANS-EXIT.
000660 PROCESS-TC-ERROR.
000670     ....
000680
000690 PROCESS-TRANS-EXIT.  EXIT
```

Figure 7

Cobol GOTOs Work Best in Some Situations

(Continued from Page 25)

present implementation of ANS Cobol, the programmer is forced to code another paragraph, since IF does not have a delimiter.

Therefore, the use of GOTO in this case is the better way of implementing this type of logic.

Another instance where GOTO can be used to exit from a paragraph is in the case of adding or updating an on-line program.

We may enter a record on a terminal, say a CRT terminal, and when all fields in that record are valid, use it to create a new master record or update an existing one. Usually, most of the terminal screen would be used for data, leaving only a small portion at the bottom for error messages. In most cases, therefore, the number of error messages that can fit on the screen is smaller than the maximum number of errors that can be detected. For instance, a record may have 20 fields, all of which may be in error, while there are only six positions for error messages.

This is not a problem, because in most cases, the actual number of errors detected for a single record would really be just one or two. However, the program does have to allow for the number of errors being greater than the number of error message positions.

To achieve this, we count the number of errors as we validate the data on the screen. Once we have detected a number of errors equal to the maximum number of error message positions, we then stop validating the rest of the fields on the screen and display the error messages so the operator may enter the corrections.

At this point, there is no sense in further validating the remaining fields, since even if another error is detected, there is no space for the corresponding error message. (See Figure 6.) You will note that the use of GOTO is very effective.

GOTO Depending On

The Case construct is a very effective way of solving a problem where we process a transaction in several possible ways depending on the value of a field. If the value is one, we process the transaction in the first paragraph; if two, we process the transaction in the second paragraph and so forth.

We can accomplish this in Cobol with the DEPENDING ON option of GO-TO and GOTO statements at the end of each of the paragraphs. (See Figure 7.) This does not violate the principle of one-entry one-exit. The entry point is statement 000500 and the exit point is statement 000690.

Pacifico A. Lim is a project leader for Merchandise Statistics Systems at Lord & Taylor, New York. Lim discusses the question of PL/I in ANS Cobol programs in his book, A Guide to Structured Cobol With Efficiency Techniques and Special Algorithms, *to be published in December by Van Nostrand Reinhold Co.*

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Upkeep Costs Can Be Reduced

(Continued from Page 23)

needs to be changed, but that should not prevent the programmer from adding internal documentation such as comments to the program.

For example, in evaluating logic changes or additions to a program, the analyst or programmer must first determine the main logic paths and the function of various blocks or routines. He may keep this information in his mind or he may scribble notes on the back of another used Cobol coding form which will also disappear when the project is complete. When the next programmer must make any sort or maintenance change to that program, he will go through the same process of determining logic paths and the functions of blocks or routines.

Why not encourage the first programmer to put those comments and explanations in the source program so that the next programmer does not have to repeat the mental exercise?

Of course, adding written documentation such as comments to a program does take longer than scribbling those comments on a sheet of paper, or keeping it inside the programmer's head, but management should insist that programmers not continually repeat the same mental effort that the previous programmer went though six months ago.

Better Testing

The final way to reduce maintenance problems is develop a better way to test programs or systems that have been modified. Typically, a programmer will create a set of test data designed to show that his new transaction or new data fields are performing according to specification. What he does not generally test are the other 50 transactions and 200 logic paths he supposedly did not touch, usually because he has no good way to test those except by the customary "parallel test."

Besides the "parallel," another good way to test maintenance changes is to develop a standard set of test data that will run through most if not all of the program or system logic paths and will give known results. This is an excellent way to find errors and problems caused by maintenance changes before they go in production at 3 a.m.

Singer is a project manager for Computech in Columbus, Ohio.

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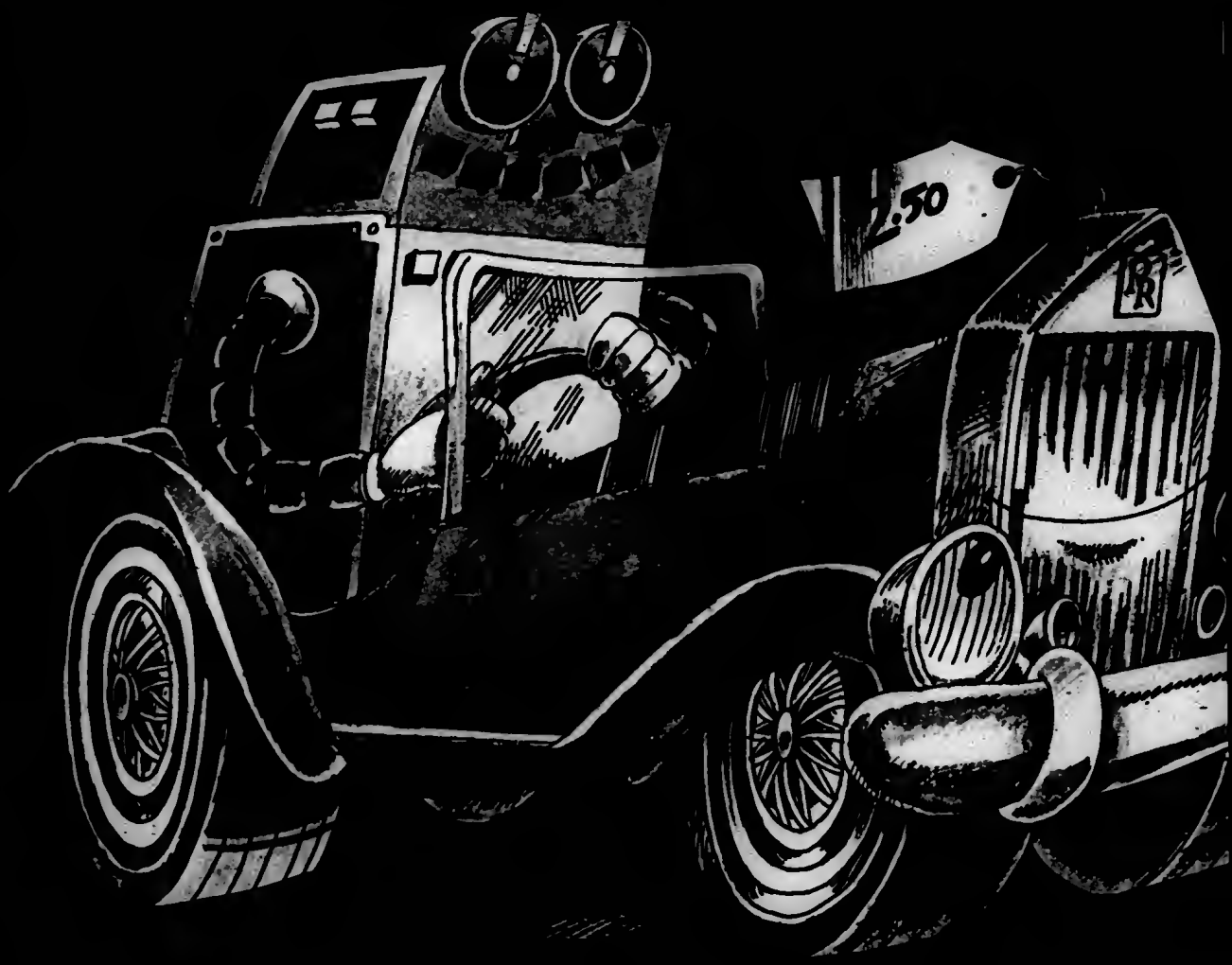

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In only thirty years the industry has gone from the development of the giant Eniac system, through the tube-powered, water-cooled Univac I (the world's first business computer), to the incredibly cheap, battery-powered microprocessor.

But as unbelievable as the last 30 years have been, the next 30 will probably be even more incredible. Right now, IBM has begun delivery of a new computet series that will, by itself, provide four times as much processing power as all the previous computers delivered by the company. And they have announced a new "superconductor" that could improve computer speed and performance by a factor of 500 in the next seven years! It's hard to remember this is real science, not fiction.

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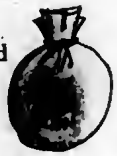

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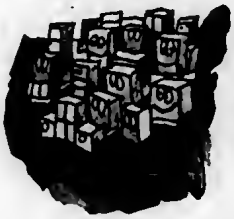

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'Nodal Programming' in Store for Micro-Net

(Continued from Page 23)

of the large systems.

That has its points. It won't take long, though, before the question arises as to whether the network needs some new type of programs, with the large systems and the small systems sharing whatever they can.

In short, soon some hobbyist will start programming the network on the micro/DEC systems.

This confirmation of the trend to nodal programming is important for a number of reasons. It confirms, for instance, the importance of reliable and compact programs. It suggests, too, that languages such as Forth, Cobol and Pascal will be contenders for commercial as well as scientific programming and operations.

Compact coding calls for small target nodal computers, with program development on different and much larger systems with sophisticated tools. To the programmer, the quality assurance people and the auditors, this has many attractions — including the high performance achieved when the system can be written into the chip.

As in Micro-Net, nodal facilities are not yet ready for such program development and use, but the hardware, the concepts and the connections are all there. It won't be long.

So, Micro-Net, welcome to the developing 1980s computer scene. It will be interesting to keep up with you and your confreres as you join the facilities of different computer worlds.

Further information on Micro-Net is available through John E. Meier, Compuserve Inc., 5000 Arlington Center Blvd., Columbus, Ohio 43220.

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To Win Acceptance, Press Hot Buttons

(Continued from Page 23)

practically perfect.

The first thing he did was obtain a group of publicity photos of the aircraft from the manufacturer, showing the plane parking at its hanger, taxiing, taking off and cruising. He organized these photos into a slide sequence that simulated the mission profile.

Then he employed artist's sketches on other slides to illustrate how some of the subsystems would operate. Of course, the ones he chose were the "hot buttons" of the key decision makers in the audience.

The slides did a first class job in explaining to the executives at feasibility study time what the system could do seven years down the pike. Naturally, we won the feasibility study contract. (To complete the history, the government cancelled the program before system implementation began.)

In any of your communications on systems to non-DPers, you might check to see if the system operating capabilities are easily described in the frontend of your documentation and briefings. In your description, you should use symbols familiar to the intended audience, preferably photos of the hardware, with operators in attendance. You ought not to use flowchart symbols, as this language is really peculiar to the trade.

If you can show off the system with a hands-on demo, wonderful! If you can't, then showing the users simulated hard-copy output listings, with "hot button" data, would be the next best thing.

But whatever you do, you should remember that an understanding of the system "operating concept" is basic to user acceptance. Align your communications accordingly.

'Stop Coming Around Here Accusing Me of Loafing! You Old-time Supervisors Will Have to Get Used to the Push-Button Computerized Industry!'

ANNOUNCING
PANVALET/ON-LINE 2.1

PANVALET/ON-LINE, the system that combines the speed and ease of on-line programming with the control and dependability of PANVALET, has been further enhanced. Two new commands—GET and SUBMIT—expand the versatility and selectivity of the editing transaction.

The GET command is used to copy programs or portions of programs into a program under edit, and provides maximum flexibility for the insertion of retrieved data and its renumbering.

The SUBMIT command is used to submit a control input stream into a batch partition. Users can submit job streams directly from the PANVALET library, submit up to five job streams at a time, merge edit changes at the time of submission (temporary update), submit supersets and/or subsets, expand embedded + +INCLUDE statements, and have the option to retain or flush the change file.

Working through CICS, PANVALET/ON-LINE provides the tools to streamline the editing, display and submission of programs, while the library remains protected at all times. A complete hard copy audit trail of library change activity is produced automatically. And PANVALET/ON-LINE is the only on-line processing system that provides the same dependable capabilities as PANVALET . . . security, control, compression, management reporting, level numbering and backup.

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Offer More Than Mere Compatibility

Amdahl Packages Boost VM/370, IMS

By Don Leavitt
CW Staff

SUNNYVALE, Calif. — Though users of Amdahl Corp. mainframes may have acquired the machines partly because of their compatibility with IBM software, Amdahl has now shown it feels users deserve more than just compatibility.

In a pair of announcements made 10 days ago, the company described packages that are intended to boost the performance of two major IBM systems — the Virtual Machine facility (VM/370) and the IMS data base management system (DBMS).

Two separate updates of Amdahl's Virtual Machine/Performance Enhancement (VM/-PE) software extend support for OS/SVS Release 1.7 operations under VM/370, in addition to the OS/MVS under VM backed by the original VM/PE introduced in February.

Also built into Release 2.0 and 2.1 of VM/-PE are support for MVS Release 3.8, VM/370 Release 6 and VM/BSE Release 2.0, new I/O channel-masking options, improved page zero swap logic and more flexible use of the VM/370 INDICATE command, a spokesman said.

First customer shipments of VM/PE Release 2.0 will be in December. Release 2.1, which will include an otherwise undefined "VM/PE Performance Monitor" and support for IBM's VM/SE Release 2.0 and MVS/SE Release 2.0, is expected to be ready for delivery in the first quarter of 1980. Each release will costs $1,500/mo, the spokesman said.

A Hardware Monitor Interface was also introduced to aid performance measurement (see story on Page 45).

Centrally supported products are not the only software Amdahl is now offering. It has also introduced a class of products under the general title Amdahl Internally Developed Software (Aids). These products were written by individual Amdahl employees to improve performance or productivity.

First of the Aids line is a package called the IMS/VS Hdam Optimizer, which is said to improve the performance of IBM's IMS/VS Hdam, "a widely used IMS access method." The Optimizer reduces the number of physical I/O operations to process an Hdam data base, the spokesman said.

The Amdahl software also supplements the normal IMS/VS reorganization utilities that control physical data placement. In addition, it measures the effectiveness of various Hdam configurations, he stated.

The IMS/VS Hdam Optimizer, scheduled for shipment this month, costs $225/mo, with fees discontinued after 24 months.

Amdahl is at 1250 E. Arques Ave., P.O. Box 5070, Sunnyvale, Calif. 94086.

NDS' 'H-Chart' for IBM Users Shows Cobol Module Hierarchy

W. BLOOMFIELD, Mich. — Running on IBM 360, 370 or 30 series equipment under OS or OS/MVS, the H-Chart package from National Database Software, Inc. (NDS) is a Cobol hierarchy chart generator. It produces a graphic representation of the organization of structured Cobol source programs.

The package accepts the user's Cobol source program as input. From an analysis of that, it provides a complete, concise list, by functional decomposition, of all possible program execution paths. Output is presented in an easily readable form, a spokesman said.

H-Chart analyzes program control flow by tracing the execution paths defined by PERFORMs, CALLs, Sort I/O procedures and, optionally, GOTOs. These paths are then organized in a tree structure, represented as a series of nodes and node connectors.

H-Chart requires a region of 220K bytes, but will produce a hierarchy diagram of an "average" Cobol program — 1,500 to 2,000 lines — in approximately half the time needed to compile the same program, the spokesman said.

The diagrams produced by H-Chart include three levels of nodes, starting with the program ID as the root node. "Fall through" procedure names are not traced, according to the spokesman.

Certain types of nodes are specifically identified. For example, those functions that are subordinate to one or more different major functions are marked by the word "common," formatted into the node border.

If a user invokes GOTO tracing, all common node identification is suppressed, and those procedures charted because of a GO-TO will be identified by having that word added to the node border.

Finally, H-Chart flags routines that are recursive, whether intentionally or not, with the word "loop."

H-Chart is currently available for $5,400 from NDS at 3480 Centerbrook, W. Bloomfield, Mich. 48033.

DG Mini Users Gain DBMS

THORNWOOD, N.Y. — The Data Network Arranger (DNA) from Exact Systems and Programming Corp. (ESP) is a data base management system (DBMS) — built around a menu-driven screen and program generator and a multiuser execution monitor — for Data General Corp. minicomputers.

DNA consists of more than 100 modules written in Fortran IV and uses the host machine's I/O facilities. The system supports the storage, retrieval and deletion of records from a single, contiguous file.

The package also supports inverted files, allowing as many as 64 indexes or inversions per file. Any data field can be a key field, and linked-field keys can be used.

Multilevel indexing is handled automatically, and storage reorganization is never required, a spokeswoman said.

Storage space is released and reused once a record is deleted. Other "automatic" features are said to include data compression (and later expansion) and updating of all indexes on data entry.

DNA has an on-line inquiry facility in addition to the multiterminal, multitasking execution support. In common with many data base systems, DNA has a data dictionary facility, allowing definition of each data field by a symbolic name, a number, data type and length.

User-Coded Program Backing

In addition to the on-line query support, the system also provides backing for CALLs from user-coded programs or any other procedural language that has a call facility and is available on DG equipment.

Other extensions of DNA include menu and dialog generators, report and display generators and a data manipulation facility. An on-line interactive applications development package, which permits free-form definitions of screen layouts in real-time on a CRT screen, can also be used.

Currently available for installations with DG Novas or Eclipses running under RDOS or AOS, the package carries a license fee ranging from $10,000 to $30,000, depending upon CPU configuration. The package can be ordered from ESP through P.O. Box 115, Thornwood, N.Y. 10594.

Random Notes

IMSL Library Out For VAX-11/780

HOUSTON — The International Mathematical and Statistical Library, Inc. (IMSL) has adapted its IMSL library of Fortran subroutines to run on Digital Equipment Corp. VAX-11/-780 superminicomputers, according to a company spokesman.

Previously implemented on a wide range of mainframes and minis, the routines were designed for use as building blocks in developing application programs. The library is available on a subscription basis for $1,200/year and includes source code on magnetic tape, a reference manual, updates and telephone consultation.

IMSL is on the sixth floor at 7500 Bellaire Blvd., Houston, Texas 77036.

Inventory Management Announced for TRS-80

HOLLYWOOD, Fla. — An inventory control system designed to run on a 32K-byte Level II Radio Shack TRS-80 with two or four floppy disks and a printer is now available from National Software Marketing, Inc. The system supports the ability to store and then retrieve, on-line, as many as 3,000 items.

The master file includes quantity on hand, quantity on order, reserved stock level, safety stock level, average and standard costs and sales figures for both month-to-date and year-to-date for each item.

Shipped on a floppy disk with a reference manual, the package costs $89.95 from P.O. Box 6195, Hollywood, Fla. 33021.

Exchange Meeting Set

SAN FRANCISCO — The 31st international meeting of Exchange is set to begin here Oct. 10 at the Sheraton Palace Hotel. Exchange is an association of users of computer systems built by Scientific Data Systems, Inc., Xerox Corp. and now Honeywell, Inc.

Highlighting the meeting will be an open panel discussion by many of the users of the CP-6 operating system that runs on Honeywell-built CPUs and is the successor to Xerox's CP-V.

Registration is $70. More information is available from Jim Hargrave, Honeywell, P.O. Box 6000 (M.S. T99), Phoenix, Ariz. 85005.

'Ultra-Text' Weds Level 6 Mini, WP Terminals

NEW YORK — Software support enabling Honeywell, Inc. Level 6 minicomputers to handle word processing (WP) and, in the advanced version, page composition and document flow as well as standard DP operations is now available from Advanced Computer Techniques Corp. (ACT).

Ultra-Text I was described by ACT as a stand-alone WP package, apparently for a single user on a Level 6 mini. In contrast, Ultra-Text II is a multiterminal system combining WP, DP and advanced page composition with networking and document flow management.

Each installation will be tailored to a client's current and future needs, a spokesman said, adding that the systems are intended to be people-oriented. The Ultra-Text II package, for example, supports a HELP system so that users can request explanations of functions while at their terminals.

Though he added no other specific information, the spokesman claimed the software provides networking provisions that "break traditional shared-logic barriers of information flow and access, complete management control of security features and integrated word and data processing to maximize return on investment in office automation."

He also noted that the software provides support for a wide range of office peripherals including optical character recognition, computer output microfilm and photocomposition systems, as well as communications with other WP systems.

Although the software can run on any Level 6 mini with Honeywell's Gcos, Ultra-Text II requires a specially modified Ontel Corp.-based terminal with ACT's label. These cost $5,500 each. Either Diablo or Qume printers are also required for high-quality output.

The software itself varies in cost, depending on the number of terminals to be supported, from $15,000 for one to six terminals to $25,000 for up to 16 terminals.

The vendor is at 437 Madison Ave., New York, N.Y. 10022.

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'Optimizer III' Adapted To DOS/VS Environments

PHOENIX — With the introduction of a new version of the Optimizer III package from Capex Corp., users in IBM DOS/VS — and presumably DOS/VSE — environments can have the same programmer productivity support that has been available to OS/VS shops through the earlier Optimizer products, a spokesman said.

Optimizer started as an object-level tuning system that would accept the user's entire Cobol program as input to an analysis operation. Determining the complete logic flow of the porgram, Optimizer would eliminate much of the compiler-generated code that served no purpose in the particular program under review.

It dropped, for example, the dummy exit coding generated at the end of each paragraph in the Procedure Division, unless a PERFORM statement required the coding to remain. Optimizer never changed the application logic of the user's program, the spokesman emphasized.

Later versions of Optimizer — including DOS/VS Optimizer III — also provide reports of flawed logic. Code that could never be used because there was no branch or fall-through into it can be identified, giving the programmer the opportunity to fix the program before it goes into production.

The net effect of using these analyzer and detector components is that programmers are relieved of some of their most time-consuming activities, programs can be made more reliable, object programs can have CPU requirements cut "at least 10%" and storage requirements can be cut "more than 20%," the spokesman said.

That means the user's programs are smaller and more efficient, since they run 20% faster with less paging in main memory, the spokesman claimed.

The Optimizer III varies in cost according to the CPU that will use it. The DOS/VS implementation, for example, costs $10,800 on mainframes up to and including the 370/148. Sites with more powerful systems, including IBM 30 series machines, will be charged $13,800.

Capex can be reached through P.O. Box 13529, Phoenix, Ariz. 85002.

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Reporting Eased Under 'Culprit'

WELLESLEY, Mass. — A free-form language, support for compound arithmetic operations, IF statements and names up to 32 characters long are all features included in Release 5.0 of the Culprit report generator package from Cullinane Corp.

Intended for IBM 360, 370 and compatible mainframes under any of the available operating environments, Culprit's updating also includes global selection logic and workfields.

These features allow totally different reports to share the same information, such as calculation or selection results, a spokeswoman said. They free the user from having to enter the same parameters several times and increase runtime efficiency by eliminating duplicate code, she added.

Various parameter statements have been simplified in Release 5.0. The Profile parameter — which contains information that pertains to the entire Culprit run — may be coded if the user wishes to override the system defaults. Otherwise, it may be omitted.

The Input parameter has been reworked so that only one statement is needed for each input file in the run. The optional Output and Sort parameters have also been enhanced, the spokeswoman said.

Culprit 5.0 can be used as a stand-alone batch report generator or as a component of Cullinane's family of products organized around the Integrated Data Base Management System (IDMS). It can access any standard record structure or commonly used file organization.

The updated Culprit is available immediately under license for $20,000 with a 10% annual revenue fee, Cullinane said from 20 William St., Wellesley, Mass. 02181.

Print Support Broadened In Updating of 'Word-11"

PLACENTIA, Calif. — Version 2.2 of Word-11, a software package that enables users of Digital Equipment Corp. PDP-11s to run DP and word processing (WP) tasks concurrently, is ready now, according to the vendor, Data Processing Design, Inc.

A menu-driven system, Word-11 allows the interactive creation, editing and printing of documents. In addition to standard WP features, it offers extensive text search and replace capability, the ability to create Ascii files and powerful sort and transfer utilities, a spokeswoman claimed.

Support for 132-char. wide documents — "ideal for financial reports" — large "cut and paste" files, multiple command strings executed by a four keystroke sequence, on-line storage capacity of some 200K pages and a 30K-word spelling dictionary are also provided, she added.

Version 2.2 adds support for multi-character set printers, expanded spelling error detection aod chaining to and from application software. An "elaborate" user-controlled hyphenation technique is among the extensions.

Word-11 can support up to 60 simultaneous users, including 60 CRT terminals (DEC VT52 or VT100 or equivalent units), 10 sharable letter-quality printers, eight high-speed printers and 1G char. of on-line storage, the spokeswoman continued.

The software consists of a system of program modules operating as a job under RSTE/E. With the increased performance of Version 2.2, Word-11 provides a powerful mix of WP and DP capabilities, she added.

A single-CPU license fee is $7,500, including installation, training and support, the vendor said from Suite F, 181 W. Orangethorpe, Placentia, Calif. 92670.

DBMS to Be Compared

WAKEFIELD, MASS. — A four-day seminar here later this month will provide comparative information about many of the currently available data base management systems (DBMS), according to a spokesman for the Institute for Science and Public Affairs, which is organizing the meeting.

Led by Dr. George Schussel, a vice-president of American Mutual Insurance Companies and a national lecturer on DBMS, the program will be made up of introductory general sessions followed by technical presentations from nearly two dozen DBMS vendors.

Running Oct. 15-18 at the Colonial Hilton Inn here, the seminar and lectures by Schussel will focus for the first two days on software of the 1980s and for the last two on the problems and opportunities facing the data base world, an institute spokesman said.

The registration fee is $450, although a discounted fee of $395/person applies if more than one person from the same organization attends. Hotel accommodations are not covered by those fees, but a block of rooms have been set aside at the inn and are available at special rates if the seminar is mentioned when reservations are made, the spokesman reported.

More information about the conference is available from Advanced Management Research, 60 E. 56 St., New York, N.Y. 10022.

Course Ready on 30 Series

AVON, Conn. — Systems programmers and their managers as well as operations personnel are expected to reap the greatest benefit from the self-study, video-based course on IBM 30 series system and console operation just released by Computer Systems Research, Inc. (CSR).

CSR's package includes nine workbooks amounting to more than 900 pages of text, 17 videotape presentations and four machine exercises. The exercises provide practical operating experience to reinforce the training provided by the other parts of the course, according to a spokesman.

Subjects covered range from the very fundamental computer numbering systems through a system architecture overview and interrupt processing to 30 series problem status recording.

The spokesman said the machine exercises can be easily adapted for the using organization's particular configuration and its operating standards.

The package costs $8,000 CSR reported from 195 West Main St., P.O. Box 45, Avon, Conn. 06001.

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9 Kansas City, MO
9 Quebec City, QUE
9 San Jose, CA
9 Tallahassee, FL
9 Washington, DC*
11 Detroit, MI
11 Orlando, FL
16 Milwaukee, WI
16 Rochester, NY
18 Los Angeles, CA*
23 Hartford, CT
24 Providence, RI
25 Harrisburg, PA
25 London, ONT
25 Portland, OR
30 Buffalo, NY

November
8 Bridgeport, CT
6 Hamilton, ONT
6 Seattle, WA
7 Ottawa, ONT
8 Austin, TX
8 Toledo, OH
8 Westbury, NY
13 Ft. Lauderdale, FL
13 Indianapolis, IN
13 St. Louis, MO
14 Chicago, IL*
15 Albany, NY
15 Phoenix, AZ
15 Richmond, VA
20 Pittsburgh, PA
27 San Francisco, CA*
28 Baltimore, MD
29 San Diego, CA

December
4 Ann Arbor, MI
4 Minneapolis, MN
4 Saddlebrook, NJ
6 Ft. Worth, TX
6 Salt Lake City, UT
11 Allentown, PA
11 Cleveland, OH
11 Nashville, TN
13 Charlotte, NC
13 Newport Beach, CA
19 Cincinnati, OH

January
8 Dayton, OH
8 Portland, OR
8 St. Louis, MO
10 Dallas, TX*
15 Atlanta, GA*
15 Cleveland, OH
15 Phoenix, AZ
16 Chicago, IL*
15 Hartford, CT
16 New York, NY*
17 Nashville, TN
17 Omaha, NB
17 Toronto, ONT*
22 Detroit, MI*
22 Houston, TX*
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22 Philadelphia, PA*
22 Providence, RI
22 San Jose, CA
24 Louisville, KY
30 Montreal, QUE

February
5 Kansas City, MO
5 Tampa, FL
6 Las Vegas, NV
8 Washington, DC*
8 Westbury, NY
7 Birmingham, AL
7 Indianapolis, IN
7 Minneapolis, MN
12 Little Rock, AR
12 San Diego, CA
13 Milwaukee, WI
13 Ottawa, ONT
14 Buffalo, NY
14 Denver, CO
14 Tulsa, OK
20 Bridgeport, CT
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Basic Meets Agency's Need for Quick Programs

WASHINGTON, D.C. — Each day, Voice of America engineers may need to alter broadcast frequencies because of changing weather and atmospheric conditions. Determining the best frequencies requires a lot of number crunching.

By using on-line terminals, however, the engineers can dial up the data center at the International Communication Agency (ICA), access complex formulas and in seconds complete calculations that might otherwise eat up hours of staff time.

The engineering department has realized for some time what a productivity boon such computer access promised. But, until a year ago, the agency's DP department was forced to reject engineering requests for help with a variety of small, on-line applications. The DP department was not unwilling. It was simply unable to cost-jostify the development of small, on-line applications programs.

The benefits that engineering personnel, budget and other departments might derive from such programs always had to be weighed against the exorbitant cost of creating dedicated on-line systems for small applications.

'Basic' Solution

John J. Perry, deputy chief of operations for the agency, found a solution to the small-program dilemma with a Basic language time-sharing system originally designed to give computer access to high school and college DP students. Perry adapted it to a commercial environment on ICA's NCR Corp. Century 251.

On-line programs can be developed in a fraction of the time required to create comparable Cobol programs, he noted.

"Before we began using the time-sharing system, our payroll department asked us to develop an on-line program," Perry recalled. "By then, three people had worked on the project for three months."

No Coding Sheets

"Using Basic, I wrote an on-line application for the personnel department in six weeks working alone. The average time needed to write, test, debug and install an on-line application has been four weeks.

"I can't minimize the impact this truly interactive programming capability has had on our operation," Perry commented. "There's no need for coding sheets or keypunching. A programmer simply sits down at a terminal, enters a program and says 'run.' If there are no errors, that is all there is to it.

"The system not only has helped us make more efficient use of our time, but it has made programming more fun," he added. "Changing programs is so fast and easy. There is none of the frustration one can encounter with a compiled language and attempts to interface with dimly understood routines.

"In fact, I often take one of our three portable terminals home to work on programs. Programming is more enjoyable than watching many TV shows. If you're not having fun with this system, you're doing something wrong."

New Options

The low-level implementation of Basic is so simple almost anyone can write a program, according to Perry. This has given him and department users new options.

He uses Basic to introduce talented computer operators to programming, while some users who have taken a college course or two in Basic are writing some of their own programs.

Perry said the time-sharing system is best suited for dynamic but simple applications that require relatively small files.

One such program at ICA simplifies budget analysis by permitting managers to look at committed and available funds at any point in time. Another speeds look-up of purchase order status.

Their personnel department uses a number of on-line programs to pull statistical reports and listings based on any set of criteria, such as foreign service officers with appointments due to expire in a month.

"This system does not work well for terribly complex applications," Perry commented. "Since file names and tags are one letter plus one number, it is easy to write a simple program but difficult to solve complicated problems with Basic programs."

Strings Attached

A new system user must adjust to the fact that all data is processed in strings, either alphanumeric or numeric, Perry commented. He recommended alphanumeric strings for storing data.

If data must be accumulated, the program can convert the alphanumeric string through a conversing routine and proceed to perform calculations, he added. The result can then be converted back to an alphanumeric string for file storage or editing prior to CRT display.

Success in Strings

"We've been very successful in looking at our files and data as a series of strings," the deputy chief of operations said. "Then a data dictionary can be created which defines data files by listing the field name, string number, position, length occurences and the edit mask for a field. This allows us to extract and manipulate data quite easily."

The time-sharing system's file structure is its major drawback, Perry observed. Each program on file is allocated space in one time-sharing file via a bit map, which becomes the directory to the file. Data within files is stored as either alphanumeric or numeric floating-point strings. This makes all NCR Century batch files incompatible with the time-sharing file.

Perry's staff has found a way to pass data between time-sharing and batch programs, however, so the incompatibility is no longer a major problem.

Message Switching

Perry also described a message-switching technique that allows information and transactions to be passed from one terminal to another. This technique allowed ICA to automate its tape library system, which keeps track of some 3,000 tapes.

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Package Drives WP on Eclipses Under AOS

SAN RAFAEL, Calif. — Word processing (WP) software from Satellite Systems, Inc. (SSI) was designed to run on Data General Corp. Eclipses and to be used by operators previously untrained in data processing.

Extreme care was used to give underlying power and flexibility while using standard office terminology and techniques, a spokesman said. All functions are invoked with just one or two keystrokes.

Running under DG's Advanced Operating System (AOS), Revision 2.0 or later, the software supports unlimited text entry, text deletion and automatic formatting. Any amount of text can be entered at any place in the stored document, and the context is maintained and updated on the CRT screen.

Formatting includes all the conventional user-defined specifications margins, tab settings, line spacing, page length, headings and footers as well as a left margin release.

Headings and footers can be inserted by the system at positions defined by the operator, but the predefined text can be altered as desired.

Another range of capabilities includes support for a text search, which may be done in a forward or reverse direction seeking a specified text string of reacting to a user command. Any amount of text can be designated as a "range" of text to be treated as a separate document for editing or "cutting and pasting."

The software is available on 800- or 1,600 bit/in. magnetic tape. Its cost ranges from $6,500 for an M600 installation to $4,500 for S130 sites.

SSI is at 466 Bahia Way, San Rafael, Calif. 94901.

Business Packages Run on Micros

LITTLE ROCK, Ark. — Users with 8080- or Z80-based microcomputers can acquire a range of business-oriented software packages — including newly announced order entry and inventory systems — from Arkansas Systems, Inc.

The company previously introduced support for general ledger, payroll, accounts receivable and accounts payable processing. The packages have been installed in numerous business environments, and all six products are ready for immediate shipments, a spokesman said.

Although they can be used independently, the packages were designed to work together as an integrated system. Order entry, for example, adjusts inventory and accounts receivable records and prints invoices for up to 500 outstanding orders.

Inventory maintains four prices and markups along with 12-month sales history. The general ledger system handles 200 accounts and prints a balance sheet and an income and expense statement with percentages shown.

The standard accounts receivable support will handle 500 accounts, but a special version will handle 2,500 receivable customers.

The vendor is offering object code for the basic system — order entry, inventory and payroll — for $700. While the programs were written largely in Fortran IV and source code is available for an additional $1,000, conversion to other hardware might be difficult since some assembler code is used for I/O.

Arkansas Systems is at Suite 206, 8901 Kanis Road, Little Rock, Ark. 72205.

Toronto Group Starts Courses

TORONTO — Short courses normally scheduled in the evenings but sometimes given Saturday mornings will be offered by Human Computing Resources Corp. (HCR), particularly for people interested in microcomputers.

Two of the fundamental courses are "How to Buy a Computer for a Small Business" and an "Introduction to Microprocessors." Also appropriate for beginners is the "Introduction to Computing and Personal Computers" course, starting in October and repeated in January.

People already working with systems might take "Introductory Programming in Basic," starting Oct. 15 with repeats four times later; "Advanced Programming in Basic" in November, February and April; and "Programming in Pascal" in November and March.

The courses vary in length and in costs ranging from $75 to $175. HCR reported from 10 Saint Mary St., Toronto, Ont., Canada M4Y 1P9.

"How to Document Program Changes and Enhancements Internally"

This report presents a new technique which helps increase programmer productivity in maintenance and new developments. It provides instant indentification of program changes and also preserves an audit trail of the changes. This easy-to-learn technique can be adapted for most programming languages on any computer system. Examples from the real world COBOL and BAL programs are included. The report is available for $10 (prepaid) from

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This is a CICS/VS test for DP Managers

There are two significant CICS/VS performance analysis software packages on the market. One is Johnson Systems' UTILIZATION MONITOR AND CHARGEBACK SYSTEM. The other is IBM's PA-II. Both provide a method for determining and recovering your CICS cost of operation. Both offer report formats and graphic outputs. Both have been used and tested by hundreds of installations. But . . . one is clearly superior.

Take the test. The answers will surprise you if you want CICS/VS resource control designed to meet your needs.

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1	Which system has up to 100 different easy-to-modify report formats including graphic outputs you can tailor to meet your needs?	A	B
2	In which package is logging limited to one record per transaction?	A	B
3	Which system lets you define your own billing algorithms based on dozens of chargeback variables?	A	B
4	Which package offers user defined logging and space parameters, as well as automatic warm-start recovery?	A	B
5	Which company guarantees complete maintenance support and a super fast enhancement follow-up policy?	A	B
6	Which company offers its product "as is" without expressed or implied warranty?	A	B
7	Which system gives a 30 day "no risk" acceptance period?	A	B
8	Which system offers you an unrestricted number of clocks, counters, and user exits?	A	B
9	Which system does not have a lease-purchase plan so you have to rent by the month, forever, as long as you use their package?	A	B ✓

We answered #9 because, if you are stuck on PA-II, it doesn't have to be forever. You may cancel it with 30 days notice. Other correct answers are 1-A, 2-B, 3-A, 4-A, 5-A, 6-B, 7-A, and 8-A.

To date over 350 installations have already chosen JSI's CICS/VS UTILIZATION MONITOR AND CHARGEBACK SYSTEM over our nearest competitor. Full details are available by filling out the coupon below and mailing it to the leaders in performance evaluation—Johnson Systems, Inc.

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W953

"NCR's VRX is the best software product I've seen," says Stan Trawick of Bassett-Walker.

TRAWICK:
When we went to VRX (NCR's Virtual Resource Executive), our work-scheduling problems simply disappeared. Now, we run what we want to run when we want to run it. It is just a simple statement, but it makes a fantastic difference in the computer room. VRX is the best software product I've seen.

NCR's JOE KEPLEY:
VRX really takes the pressure off your operator. It will actually run up to 35 jobs at one time. It dynamically allocates memory and other resources. It oversees virtual memory swapping. It watches for memory thrashing and program loops. And adjusts the job mix to eliminate them, if they occur.

Stan Trawick (right) is computer systems manager of Bassett-Walker Knitting Co., Inc., Martinsville, Va. Joe Kepley is an NCR district manager.

TRAWICK:
And VRX gives us Online Program Development, a feature that has increased our programming efficiency tremendously. Recently, I received the print-out produced by a modified program just two hours after I asked for the programming change. That's fast. Before VRX, we'd have needed at least a day.

NCR's KEPLEY:
TRAN-PRO (NCR's transaction processing software) has helped your programmers, too.

TRAWICK:
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NCR's KEPLEY:
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TRAWICK:
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In the NCR office nearest you, there is an account manager like Joe Kepley who specializes in your industry and knows NCR systems, including VRX and TRAN-PRO. Learn how an NCR system can help you. Phone him at the local NCR office. Or write to EDP Systems, NCR Corporation, Box 606, Dayton, Ohio 45401.

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Deadline Nearing

The deadline is fast approaching for contributions to *Computerworld's* upcoming Special Report on data communications networks. Focusing on network reliability, integrity and security, the report will appear Nov. 26.

If you have advice to give or user experiences to describe or can present overviews of relevant technology, please send manuscripts within the next 10 days to the report's editor, Brad Schultz, at CW, 797 Washington St., Newton, Mass. 02160.

Manuscripts should not exceed six double-spaced, typewritten pages in length. Artwork and photographs are welcome.

Bell Eyes '81 Operation
Net of Switching Centers Set

WILLIAMSBURG, Va. — The Bell System has announced plans to give data communications users and other telephone customers more efficient and economical service with a network of computer-driven decentralized switching stations that will start operating by the end of 1981.

The network is also expected to bring a wider range of services to businesses that employ remote processing.

"We are moving to the next step in Bell System electronic switching: the No. 5 Electronic Switching System (ESS)," AT&T Executive Vice-President Richard R. Hough said at a recent conference here. "Development work at Bell Laboratories has yielded a design for the hardware and software elements of that system."

Aside from the planned digital local offices, the Bell System expects to have 37 No. 4 ESS offices in operation by the end of this year. The No. 4 ESS offices will handle long distance calls, Hough explained.

Master Plan

The Bell official expressed hope that pending legislation on national telecommunications policy will not undermine the partnership of Bell and independent telephone companies that will manage the switching network.

The Bell System has been progressive in pursuing digital technology where there are customer, economic and operating benefits to be gained, Hough claimed. "When you consider the digital plant now in place and the facilities being planned and developed, I think you will agree that we are adding to the core network's digital capacity to meet the customer needs we anticipate," he told the National Telephone Cooperative Association conference.

"As [AT&T takes] advantage of new systems, we are relating them to a master plan we call an 'Integrated Services Digital Network' (ISDN) that will provide exciting end-to-end service capabilities not now readily available," Hough stated. "And as the markets that depend on digital capability develop, we'll be ready."

Network Services

Of the evolving stored-program controlled network — which reportedly will permit customers to instruct switching equipment to provide a variety of customized communications services [CW, Sept. 3] — Hough said it will give people "in their homes or offices direct control over the selection and use of all sorts of telecommunications services that are suited to their individual needs."

(Continued on Page 38)

Low-Cost EMS to Start Up Soon

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Bargain-basement rates are the key feature of a nationwide electronic message service (EMS) scheduled to begin operation shortly.

The service initially will be restricted to facsimile transmission, but low- to high-speed data transmission on an immediate as well as a store-and-forward basis is planned.

The service will be offered by DHL, Inc., an international air freight forwarder, through a subsidiary —DHL Communications, Inc. Earlier this month, the Federal Communications Commission (FCC) approved DHL Communications' application for authority to operate as a resale common carrier.

At present, the network reportedly consists of a 1,200 bit/sec, four-wire half-duplex, multidrop circuit terminating in New York City and San Francisco. Expansion to Honolulu and Anchorage, Alaska, via 300 bit/sec circuits already in place is likely to occur by the end of 1979, according to a DHL Communications spokesman.

The parent company, DHL, Inc., is now using this network to communicate among its branch offices and will be among the customers of DHL Communications when regular service begins, the spokesman said. Should traffic warrant it, the network's 1,200 bit/sec transcontinental circuit may be upgraded to 9,600 bit/sec capability by that time, he added.

DHL Communications will also lease 50K bit/sec broadband channel communications service to users from coast to coast.

The network will be based on a star type of decentralized system. The central switching CPU is in Burlingame, Calif., and local modes will be in each city served.

Initial Services

In the beginning, DHL Communication will offer immediate delivery facsimile service to users having on-premise terminals. According to the firm's FCC application, messages will be delivered within 20 minutes after they enter the network.

The company is also thinking of offering at start-up a public message service that would allow a customer to bring hard copy to a local DHL Communications office and have it sent through the

(Continued on Page 40)

Publisher Starts Institute For Data Communications

NEW YORK — McGraw-Hill Publications Co. has announced the establishment of the Data Communications Institute, which will offer a series of courses for DP managers, engineers and technicians as well as data communications vendors' sales representatives.

The brainchild of Harry R. Karp, former editor-in-chief of *Data Communications* magazine, the institute will offer the nation's only formal curriculum in data communications, McGraw-Hill claimed. Karp will direct the institute.

Although the establishment of a school is an unprecedented venture for McGraw-Hill, *Data Communications* and other McGraw-Hill enterprises regularly hold conferences and seminars in their respective areas of interest.

The first data communications course will be held Jan. 7 at

(Continued on Page 40)

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Datel Gets 2,400 Bit/Sec International Switch

NEW YORK — RCA Global Communications, Inc. (Globcom) has implemented an automated system to switch the company's international voice, data and facsimile service — called Datel — at speeds as fast as 2,400 bit/sec between the U.S. and 29 overseas locations.

The system was developed to provide Datel subscribers with greater flexibility in transmitting their international communications traffic, according to an RCA Globcom spokesman.

"With the new switch, subscribers will gain several value-added service features," he said. These reportedly include abbreviated dialing, "hotline" service, departmental accounting and full-duplex transmission for dedicated subscribers.

Datel subscribers in the U.S. can access the New York City International Switching Center by dialing toll-free In-Wats numbers through a Centrex/public branch exchange network, private lines or Western Union's Broadband Exchange network. RCA Globcom plans to permit subscribers access through "specialized" common carrier lines, the spokesman said.

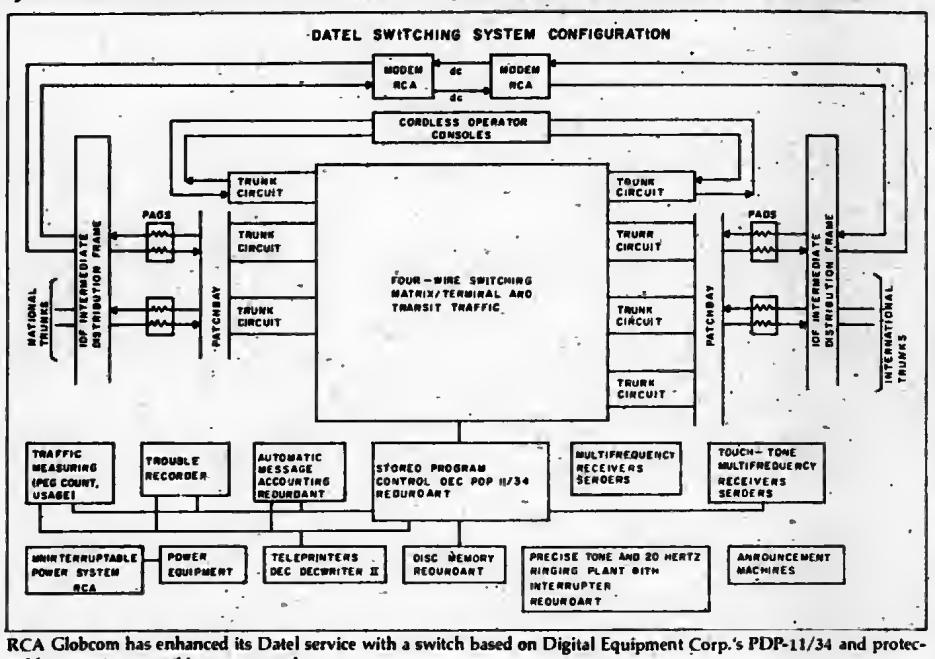
Datel subscribers abroad can access the switching system via connections established by postal, telephone and telegraph (PTT) administrations or connecting carriers. Overseas, traffic is switched by international cable and satellite facilities.

Datel will eventually offer services at speeds higher than 2,400 bit/sec, the spokesman predicted. When that happens, RCA Globcom's Q-Fax service will be transmitted through the switch as well.

The Datel system is said to handle 192 terminations and to be expandable to more than 1,500 terminations. Its "heart" is a Digital Equipment Corp. PDP-11/34 central processor augmented by a solid-state, four-wired switching matrix developed by GTE Sylvania.

"Since the system is fully redundant, fallback units can be immediately activated if an equipment malfunction occurs," another spokesman noted. The system also includes automatic message accounting units to create the information required to generate billing tapes.

Introduced in 1962, the Datel service is normally offered with a minimum three-minute charge of $12 and a fee of $4 for each additional minute. RCA Globcom is located at 60 Broad St., New York, N.Y. 10004.



RCA Globcom has enhanced its Datel service with a switch based on Digital Equipment Corp.'s PDP-11/34 and protected by an uninterruptible power supply.

Bell Plans Net of Local Switching Centers

(Continued from Page 37)

Those services may include:

- *Advance calling*, permitting a telephone user to instruct the local central office to record a message and automatically forward it later to any telephone.
- *National number calling*, giving a nationwide business with many local offices a single "easy-to-remember" nomber. The network would send incoming calls to the office closest to the caller.
- *Call screening*, allowing customers to have calls screened so only those from designated numbers would be completed.

"As far as the technology goes, the range of services that the network will be capable of providing is probably limited only by the breadth of our imagination and inventiveness," Hough declared.

Core Network Integrity

Hough observed that the future availability of low-cost communications services depends on the core network. "It is for this reason that in testifying before the Senate and House Communications Subcommittees earlier this year, we stressed so strongly the need to retain unitary management and operation of the network," he said.

The Bell officer defined this core network as a system of interrelated parts — transmission and switching facilities, a signaling process and associated operational support systems — made increasingly intelligent, efficient and cost-effective by electronic technology.

The network's "boundary is where the service line terminates on the customer's premises. Its function is to provide on demand a direct connection between virtually every household and office in the country to exchange information in a variety of forms and by a variety of means," Hough continued.

However, the interconnection of competitive long distance telecommunications companies with the network is placing new demands on telephone companies, he asserted. "The technical and operational difficulties we now confront primarily reflect the fact that we are operating under a judicial rather than an engineering solution to complex technical problems."

The cost of interconnection should be borne by those who cause the costs to be incurred, he maintained.

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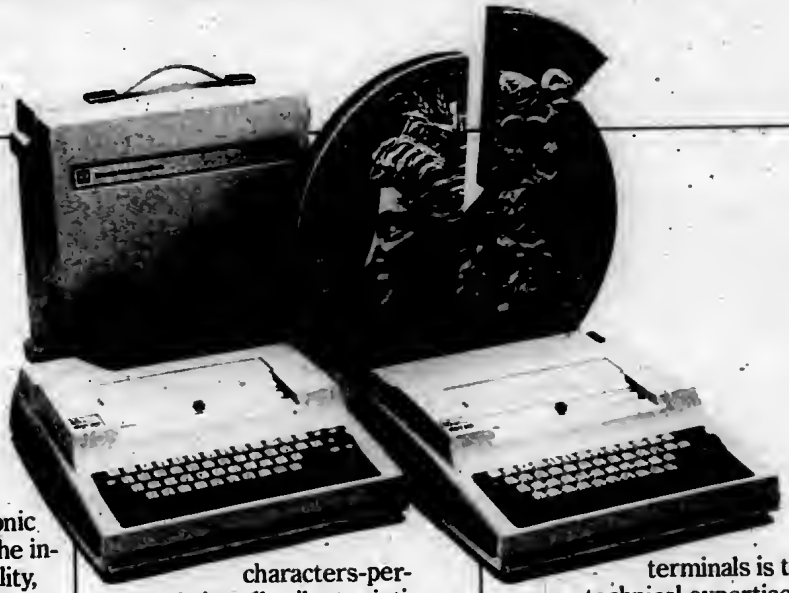

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Both the 743 and 745 data terminals are ready for immediate off-the-shelf delivery. And our nationwide network of sales representatives and authorized distributors can advise you about available quantity discount structures for additional cost savings.

Producing quality, innovative products like our *Silent 700* Models 743 and 745 data terminals is what TI is dedicated to. And TI's over 200,000 data terminals shipped worldwide are backed by the technology and reliability that comes from over 30 years of experience in the electronics industry.

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That's why TI has been appointed the official computer and calculator company of the 1980 Olympic Winter Games.

For more information about our lower-priced *Silent 700* Models 743 and 745 Electronic Data Terminals, contact the TI sales office or authorized distributor nearest you, or write Texas Instruments Incorporated, P.O. Box 1444, M/S 7784, Houston, Texas 77001 or phone (713) 937-2016.

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'Audit and Control of Nets' Topic of New York Seminar

NEW YORK — "The Audit and Control of Data Communications Networks" will be the theme of an Oct. 23-24 seminar by the EDP Auditors Association (EDPAA) New York Metropolitan Chapter here.

Directed at auditors, accountants and DP managers, the seminar will feature an introduction to the basics of a data communications network; a discussion of security threats including delay, distortion, loss, interception, deception and alteration; an overview of security/reliability measures; and treatment of risk analysis from the auditor's standpoint.

The two-day course will be conducted by Robert V. Jacobson of International Security Technology, Inc., who developed the Risk Analysis and Management Program (Ramp) for comprehensive estimates of loss exposures and control of security expenditures.

The event will be held in New York's Loews Summit Hotel at 51 St. and Lexington Ave. Registration costs $200 for EDPAA members and $250 for others.

More information is available from the association's New York chapter through G.P.O. Box 1279, New York, N.Y. 10001.

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Converter From Air Land Handles Two Protocols

FAIRFAX, Va. — A protocol converter available from Air Land Systems, Inc. and known as the PCU 200 permits the expansion of a data communications system through interconnection with another system or allows the addition of different types of computers and peripheral devices using different line protocols.

The PCU 200 has two I/O ports and allows most RS-232C-compatible devices to be put on-line under various communications protocols, the vendor said. A single-board, 8085 microprocessor-based controller offers up to 8K bytes of buffer storage and up to 8K bytes of program storage.

The converter was designed to function at program-selectable speeds up to 9,600 bit/sec.

The PCU 200 costs $2,400 in a stand-alone case from Air Land at 2820 Dorr Ave., Fairfax, Va. 22031.

Prentice Adds Trio of Modems

PALO ALTO, Calif. — A trio of Prentice Corp. limited-distance modems has been introduced that offer extended range and/or supression of voltage surges.

The ALD-XR provides a greater operating range than the vendor's standard ALD modem, extending transmission distances from 14 to 21 miles at 1,200 bit/sec and from four to six miles at 9,600 bit/sec over 26 AWG-type cable.

The ALD-LP modem protects its receive circuitry from high-voltage surges. It is available in an extended-range version, the ALD-LP/XR.

The three modems provide half-or full-duplex data transmission over two- or four-wire facilities, operating in point-to-point or multipoint modes. They are speed- and code-transparent.

Each modem includes built-in diagnostics. The ALD-XR, ALD-LP and the ALD-LP/XR are available as stand-alone units with power supply for $300, $295 and $315, respectively from Prentice, 795 San Antonio Road, Palo Alto, Calif. 94303.

I/O Board Connects To RS-232 Devices

WESTLAKE VILLAGE, Calif. — An input/output board with three serial I/O ports and the capacity to interface with most terminals, printers, readers and punches is available from Vector Graphics, Inc.

Called the Bitstreamer II, the board combines two parallel input and output ports with three I/O ports using programmable universal synchronous/asynchronous receiver-transmitters. By adding a jumper option, it can generate interrupt requests.

The board can be operated as an RS-232C port using the initilization and I/O software on the Vector Graphic extended System Monitor programmable read-only memory.

The Bitstreamer II costs $235 from the vendor at 31364 Via Colinas, Westlake Village, Calif. 91361.

EMS to Start Up Soon

(Continued from Page 37)

network to another DHL office in the destination city. At the latter point, the message could be telephoned to the recipient, transmitted on-line to those recipients with appropriate terminals, mailed or delivered by private courier.

Store-and-forward service and support for other types of data communications will be added later, according to the spokesman. The FCC application states that the existing network can interface with IBM Bisynch, international Telex "and a wide variety of asynchronous protocols."

Coding schemes can be. Ascii, Baudot, Ebcdic and any other format based on an 8-bit or shorter word length. "Broadband speeds of up to 64,000 bit/sec can be accommodated through the use of specialized broadband adapters," the application noted.

DHL Communications has yet to establish firm data communications rates, but the spokesman said walk-in public message service customers will pay "no more than $5 per page" for facsimile service.

The company plans to file a tariff with the FCC next month. DHL Communications is based at 211 Sutter St., San Francisco, Calif. 94108.

Publisher Plans Institute

(Continued from Page 37)

McGraw-Hill headquarters in New York. Topics slated for coverage in that two-week, 70-hour course reportedly include:

- The role and use of data communications.
- Regulatory agencies and related subjects.
- Functional network subsystem relationships.
- Central site hardware considerations.
- Network diagnostics and monitoring.
- Network planning and design.

All participants will receive a text prepared especially for the institute, a spokesman said. Tuition is $1,100.

The institute was not conceived as a "one-shot" or "once-a-year" conference, but its frequency depends quite a bit on demand for courses, the spokesman hinted. No specific dates have been set for six anticipated intermediate and advanced-level programs.

Any prerequisites? The institute "presupposes a certain level of involvement," the spokesman said. The attendee "does not have to be technically-oriented, but would need to know how things work." Organizers are hoping that more than just technical people will enroll for the first course, he added.

More information on the institute is available from Karp c/o McGraw-Hill at 1221 Ave. of the Americas, New York, N.Y. 10020.

Despite Imposed Regulations

LSI Seen Revolutionizing Communications

By Molly Upton
Special to CW

SAN FRANCISCO — The effects of large-scale integration (LSI) technology will be most immediately apparent in the communications arena, according to the keynote speaker at the recent Wescon/79 conference here.

While it can be said of Silicon Valley that "never before have so many done so much with so little," there are limitations to LSI, according to John R. Pierce, professor of engineering at the California Institute of Technology.

LSI is unable to display much text and depends on a CRT or some mechanical means — such as a printer — for output exceeding a few lines in length, Pierce said. Thus, in many areas, LSI must be teamed with other components that frequently raise the cost of the device well beyond the cost of its logic.

However, nearly all aspects of communications are becoming digitized, Pierce continued. The next generation of communications satellites will employ digital, rather than broadband, technology.

Other aspects will also be digitized, including switching, optical voice, facsimile and video transmission and communications channels, he predicted.

Intelligent digital switches can assign different transmission speeds to several applications simultaneously, blending voice and data traffic.

LSI in Larger Systems

To date, the successful devices in the "LSI revolution" have been stand-alone products such as hand-held calculators and subsidiary devices such as controls on microwave ovens, Pierce said. But "LSI must and will be good for larger systems."

The former executive director of Bell Laboratories' Communications Research Division called on designers to incorporate LSI in larger systems despite federal regulations and imposed standards.

"While standards are important, so is progress," he said. "It seems that the standards setters in communications are trying to cast the future in concrete.

CW at Wescon/79

"Maybe what this business needs is a respite from standards during which it can try these different [approaches] and [let] the best [of them] survive."

The Federal Communications Commission has divided communications and data processing "with an axe obviously aimed at Bell, although it is not obvious who it will hit," Pierce commented.

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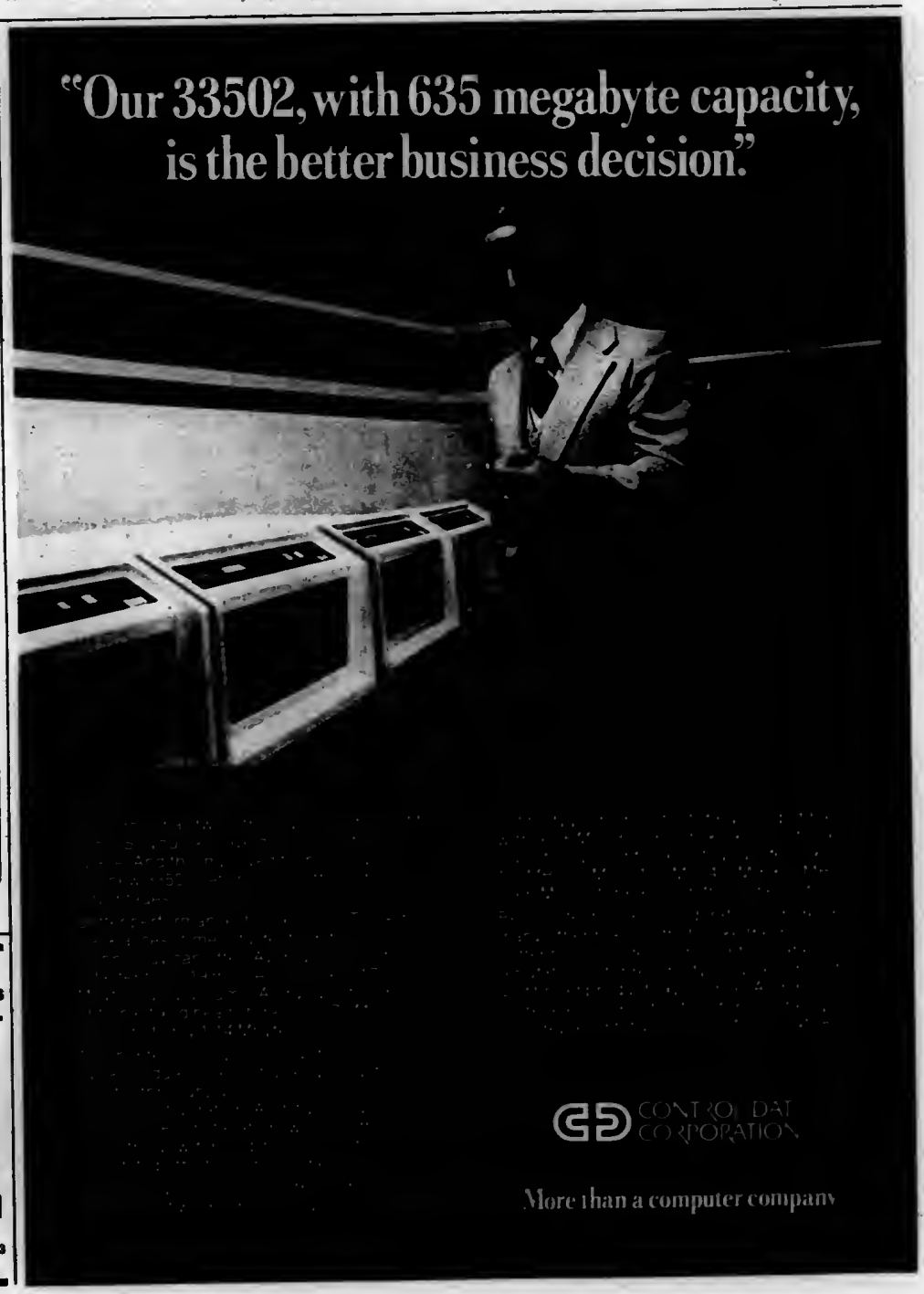

Report Examines Multiplexers

PENNSAUKEN, N.J. — Potential multiplexer buyers should analyze both frequency-division multiplexers (FDM) and time-division multiplexers (TDM) before deciding which type to use.

This was one conclusion contained in "Auerbach on . . . Multiplexers," a part of Auerbach Publishers, Inc.'s "Data Communications Equipment Reports." Tutorial discussion, graph and charts comparing the multiplexers are included.

Auerbach also recommended that users analyze large networks to determine the benefits of using TDMs for long-haul, dense-usage section and FDMs for lightly loaded sections in the network extremities, according to the publisher.

Aimed at both technical and management-level data communication specialists, the report also presents recent developments and trends for each type of multiplexer. For instance, improvements in components and reduced size have not expanded the basic functions performed by FDMs, which have reached their technological peak, Auerbach explained.

On the other hand, increased flexibility is demanded by decentralized processing and expanded communications. Trends favor TDMs because they incorporate microprocessors, allowing the use of software and thereby increasing the range of applications for TDMs, the publisher said.

"Auerbach on . . . Multiplexers" costs $25 from the publisher at 6560 N. Park Drive., Pennsauken, N.J. 08109.

For Oct. 24-25

Home Utility Forum Slated

NEW YORK — "What the user really wants is access," according to the Yankee Group, which will present information on getting education and business help into users' homes Oct. 24-25.

The Yankee Group suggested that while conventional wisdom holds that such information can come from home computers, television, FM radio or conventional cable, it is through the local telephone company or interactive cable system that consumers will access information in the future.

Among the speakers scheduled for the Yankee Group's Home Information Utility Conference are William Von Meister, who will explain "The Source," an inexpensive ($2.75/hour) home time-sharing service developed by his company, Digital Broadcasting Corp.; and Mike Aysan of Canada's Manitoba Telephone, who will discuss the future availability of an on-line information system.

Irving Kahn, chairman of Broadband Communications, Inc., will offer his views on technological advances in laser light sources and fiber optics and the way these advances will affect implementation of information systems in the home.

Other topics include new market entries in the home computer market; the market potential of interactive cable; a case study of Qube, the experimental interactive television system; and the market potential and impact of electronic distribution of information products and services to homes.

A fee of $590 covers the cost of attendance at all sessions at New York's Harvard Club, a research manual and two lunches. More information is available from the Yankee Group at Harvard Sq., P.O. Box 43, Cambridge, Mass. 02138.

Color Graphics Camera Records Terminal Output

NORTHVALE, N.J. — A color graphics camera system for recording color hard copy from the output of any raster scan graphics terminal is available from Matrix Instruments.

The unit reportedly contains a flat-faced, high-resolution raster scan CRT. It can record single and multiple images in selectable sizes on Polaroid Corp.'s Type 808 Polacolor 2 Land film; on color transparency film for overhead projection; on 35mm color slide film; and on color microfiche-format film.

Application Targets

The microprocessor-controlled system can record images at a rate of 40 to 300 per hour, depending on the film format used, according to a vendor spokesman.

The system is intended for applications such as management information graphics, satellite and aerial imaging, cartography, computer-assisted design and manufacturing (CAD/CAM) and process control.

The unit costs $10,750. Matrix Instruments is at 230 Pegasus Ave., Northvale, N.J. 07647.

Devices Measure Bit Error Rates

CHELMSFORD, Mass. — Tau-Tron, Inc. has unwrapped two devices that work together to measure the bit error rate of digital communications, fiber-optic and magnetic storage systems at speeds as fast as 1G bit/sec.

The Model STX-1001 Bit Error Rate Test (Bert) Transmitter and Model SRX-1001 Bert receiver operate in the 130M- to 1G bit/sec range using pseudo-random data patterns to exercise the tested system and determine its bit error rate, a spokesman said. The pseudo-random sequences are 127 bits and 32,767 bits long.

In addition to those sequences, the STX-1001 will generate an alternating 11110000 test pattern, the spokesman continued. Errors can reportedly be injected into the pseudo-random data at an internal rate of two errors per 100 bits of data.

The SRX-1001 provides bit-by-bit error detecting using an internally generated reference pattern. Synchronization can be manual or automatic, and the bit error rate or cumulative errors can be displayed by the device's four-digit LED display.

The STX-1001 and SRX-1001 cost $18,700 and $24,000, respectively, Tau-Tron said from 27 Industrial ave., Chelmsford, Mass. 01824.

Color Display Has 4K RAM

HARRISBURG, Pa. — A microprocessor-controlled color display generator with an eight-color foreground and background and a 4K-byte by 16 mos random-access memory (RAM) was introduced by The Telecrafters Corp.

The MCD4001B reportedly offers real-time control and interaction; RS-232C and 20mA current-loop communications interfaces; and both full- and half-duplex operation.

Compatible with 13- and 19-in. high-resolution color monitors, the system displays 80 large or standard-size characters per line with either 24- or 48 line/page. A graphics instruction storage buffer facilitates interactive communications with the graphics channel, Telecrafters added.

The MDC 4001B is available as a self-powered, rack-mounted chasis and can support up to three combined semi and full graphics displays.

The MCD 4001B with a 19-in. high-resolution monitor costs $12,000 from Telecrafters at 999 Pieffers Lane, Harrisburg, Pa. 17109.

Line Monitor Uncovers Source of Line Trouble

ROCKFORD, Ill. — If you have a problem in the future with a modem or terminal, Phone 1, Inc.'s latest line monitor could help pinpoint the source of the problem.

So said Phone 1 in unveiling its P1-5 LM line monitor, which reportedly allows the user to select various features using the monitor's keyboard. The unit has a 48K-byte buffer that allows the user to page throogh the last 48,000 characters transmitted, a spokesman stated.

The P1-5 LM costs $6,000 and is also available for rent from Phone 1, P.O. Box 1522, Rockford, Ill. 61110.

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Scouts, Terminals Cover Election for TV Station

COLUMBUS, Ohio — Rented portable printer terminals and 150 Explorer Scouts helped a local television station in Franklin County capture 67% of the election-night viewing audience last year.

Put together by Bill Vance, former news director of CBS affiliate WBNS Channel 10, the system worked well — well enough to meet approval for use during next year's election.

Vance, news director at a Fort Worth, Texas, television station, wanted to cover the 1976 national election with the aid of terminals for faster and more accurate coverage, but found that the station did not have enough to do the job correctly.

Based on his experiences during that election, he discovered it is not easy to rent terminals for one day. Before the 1978 election, he located Leasametric, Inc. in Foster City, Calif., a part of Trans Union Co. It was able to supply all the terminals WBNS needed for the election.

On election eve last year, personnel from all departments at WBNS manned the rented Texas Instruments, Inc. Model 745 teleprinters. Explorer Scouts from various scouting organizations in the city fanned out to query random samples of voters and check the posted results at the polls.

After completing their initial polls, the scouts called in their results to the newsroom, where the information was entered into the terminals. Using the acoustic couplers in the back of the 745s, the information was sent over phone lines to the computers housed at Compuserve, Inc., a time-sharing outfit based here.

The result was a system that allowed the station to predict the outcome of various races before other stations, Vance said.

"The accuracy of this system was rewarding," he stated. "In several highly contested races, where most officials were predicting a Democratic victory, our computer showed the opposite to be true — the Republicans were winning in the voting booths.

"We went on the air with this and predicted a Republican win well in advance of the election board's announcement that the Democrats had, in fact, suffered a surprising defeat."

He observed that computerized coverage to the more than 1.5 million households in the Columbus area "not only helps the viewer; it also helps in obtaining better ratings for a television station."

Vance characterized the system as "slicker than hell — fantastic," and said he would try it at his present job as news director at television station KXAS in Fort Worth, Texas, if he can find "a computer expert as brilliant as the guy I had there in Ohio."

Marilyn Pendleton, a WBNS staffer who manned a terminal during the election, said, "The system we used worked very well. We were supplied enough terminals to get the job done without overloading the main computer or tying up terminals in the station."

The station has plans for similar coverage next year, according to Larry Maisel, the present news director of WBNS. "We liked the idea of using the computers. I was not here at the time of the election, but based on reports I have seen, we would like to try it again with this or some other system in 1980," he said.

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Communications Guide Updated

CEDAR GROVE, N.J. — The 1980 edition of the *World Telecommunications Directory*, containing more than 3,000 pages of information, is now available from Telecom Systems Group, Inc.

Volume 1 lists carriers and vendors for each of more than 200 countries, territories and political divisions.

Volumes 2 and 3 cover domestic and international telephone and Telex services, while domestic and international private-lease circuit and data services are treated in the fourth volume. An appendix and tables are found in Volume 5.

Coverage of the topics in the directory is "complete" for major countries and "partial" for some of the smaller or less developed countries, Telecom said. The five volumes cost $1,575, including the first year of monthly updates.

Updates can be continued beyond the first year at an annual subscription price of $575, Telecom said from 579 Pompton Ave., Cedar Grove, N.J. 07009.

NCR CRT Gets Printer

ORLANDO, Fla. — Users of the NCR Corp. Model 796 CRT terminal with cassette port can take advantage of a thermal printer from Transaction Data Systems, Inc. (TDS).

The printer offers a full-screen memory that frees the CRT for communications with the host processor within 2 sec of pressing the terminal's print key. A full-page screen image is produced in less than 20 sec using a direct-geared platen drive, reportedly the printer's only moving part.

The unit costs $1,450, including cables, from TDS at 5750 Major Blvd., Orlando, Fla. 32805.

Device Converts Remote Terminal To Main Console

MINNEAPOLIS — Custom Systems, Inc.'s Multiuse Terminal Translator (Mutt) is a switch-controlled dataphone access and control system that enables a remote data terminal connected to a CPU to operate as the computer console.

The system is said to allow dial-up assessment of computer problems, routine diagnostics and patches and software updates.

The Mutt costs $415 from Custom Systems at 2415 Annapolis Lane, Minneapolis, Minn. 55441.

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Amdahl Adds Hardware Monitor Link

By Howard A. Karten
CW Staff

SUNNYVALE, Calif. — Amdahl Corp. has introduced a Hardware Monitor Interface (HMI) designed to attach to an Amdahl mainframe and feed monitoring signals to standard hardware monitors.

The device, which a spokesman said has been under development for several years, allows users to record 30 categories of signals from their Amdahl CPUs. Among these are the quantity of instructions executed, amount of time spent in problem or active state, interrupts, the amount of time each channel is busy and similar events and time intervals.

The HMI will not itself record this data; for that, a separate monitor is needed. However, the device is transparent to the mainframe and eliminates the danger of grounding a circuit in the computer or otherwise interfering with its operation, Amdahl said.

The $40,000 unit is scheduled for November shipment to 470V/8 users. Amdahl 470V/7 and 470V/7A users will have to wait until next June to obtain the device, which will lease for $1,865 /mo on a two-year plan. Monthly maintenance will cost $150.

Purchase credits on the HMI will accrue at the rate of 50% of each monthly lease payment to a maximum aggregate of 50% of the purchase price on the installation date or the then-current purchase price, whichever is less. An option to purchase the device can be exercised on 30 days' written notice.

Amdahl previously assisted customers who wanted to make measurements of their CPUs by supplying maintenance people to hook up devices. The speed of the Amdahl CPUs as well as the small but definite risk to operations in attaching those devices meant users had only limited access to performance data in the past, the spokesman noted.

The internal speed of Amdahl systems exceeds the capabilities of most commercial hardware monitors, he added. The HMI overcomes this problem by "scaling down" the data — that is, it measures only one-nth the data, and the results are then multiplied by n to give a true reading.

To use the device, which is field-retrofittable, a new privileged instruction is required. Privileged instructions normally have a fairly special use and are not commonly encountered by applications programmers.

The HMI will not attach to other mainframes such as those made by Itel Corp. or IBM, the spokesman said. The Amdahl systems cannot be adversely affected by introducing the HMI since it is buffered. The

(Continued on Page 49)

JJ-Based Processor With 1 Nsec Cycle Planned by IBM

By Molly Upton
Special to CW

SAN FRANCISCO — IBM intends eventually to make a Josephson Junction (JJ) computer with a cycle time of 1 nsec and estimates it could now build a 4 nsec system, according to Wilhelm Anacker, manager of exploratory cryogenic research at IBM's T.J. Watson Research Center.

Addressing a standing-room-only Wescon session here recently on picosecond electronics, Anacker described current work on JJ and some of the problems and advantages it offers. He expects IBM to make a 2 nsec signal processor using JJ technology by about 1984.

CW at Wescon/79

JJ technology functions in a cryogenic environment of 4° Kelvin — about -273°C. The superconductive nature of materials at that temperature permits dense packaging thus fast performance and a much lower heat-dissipation factor.

One chip Anacker described would have a dissipation of 5mW, and therefore doesn't need heat sinks.

However, although the electronics portion proper consumes very little power, the compressor required for cooling consumes about 20 kW of power.

The problems faced in designing the JJ system include those dealing with LSI, new and unproven materials, the lack of a good data base and the cryogenic environment.

(Continued on Page 46)

DDP: Whys and Whens — Part 2

Splitting the Function Flow: Optimizing Price/Performance

By A.L. Scherr
Special to CW

In designing decentralized data processing (DDP) systems, considerations of complexity, management structure, reliability, backup, recovery, response time and similar concerns are often more important than price/performance optimization. The key question, nevertheless, is: "Where is the best place to split the function flow between two systems so as to optimize the price/performance ratio?"

To answer this question, assume that two systems are connected via a communications line. Generally, in obtaining solutions to this problem, two conditions must hold:

- The processors are both fully utilized.
- Communications between the processors is minimized.

Clearly, the added element in going from one to two systems is the additional communications overhead. Therefore, the delays and processing time associated with communications must be small in comparison with the time between communications.

There are three partitioning points: (1) in the operating system, between the terminal and the application; (2) in the operating system between the application and the data base; and (3) within the application itself.

Converting to DDP is an attractive idea for many organizations, but how should a system be organized to be most effective? In Part 2 of this four-part tutorial, Scherr discusses some alternatives.

Partitioning within the operating system part of the flow — points 1 and 2 — has the general advantage that applications can be

(Continued on Page 50)

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IBM Working on CPU Based on JJ Technology

(Continued from Page 45)

"We think it is exciting, risky, and has high potential," Anacker said.

IBM's Goal

IBM's goal, according to Anacker, is an ultrahigh performance computer consisting of a mainframe with 300,000 circuits with a 1 nsec cycle time, a cache random-access memory (RAM) of 256K bytes with a 2 nsec access time and a main RAM of 64M bytes with a 10 nsec access time.

Looking closely at how IBM expects to achieve such a configuration, Anacker said the 1 nsec processor will require an on-chip delay speed of 400 picosec and a 500 picosec package delay, with the longest wire being a maximum of 7.5cm long. The timing margin would thus be 100 picosec for all timing elements to meet the 1 nsec requirement.

Package delay is the time needed for a signal to travel from one chip to another, Anacker explained.

The memories and CPU of a 1 nsec system would have to fit into a volume of 640 cubic centimeters, he said. IBM has not yet been able to fabricate such a device, which he predicted would require from 7W to 10W of heat. Using today's technology, a system with those capabilities would dissipate about 20 kW of heat.

The advantages of the system are its rapid switching — typically about 10 picosec — and low power dissipation. The problems usually come from the constraints in the chip manufacture — the lines in the chip must be less than 2mm thick to avoid pulse distortion. High cross-talk coupling also can be a problem.

The low temperatures used in JJ technology eliminate these problems, permitting very narrow lines that can be closely spaced. There is also less thermal noise, so the reliability potential should also be good.

However, there are other factors that may tend to hinder reliability, he said. For instance, the components are fabricated at room temperature and then cooled to cryogenic temperatures, thus creating stresses in the materials. IBM is using lead and niobium as the primary materials.

Main Memory

JJ technology can be used to fabricate memory as well as logic, Anacker said. A main memory made by IBM in its Zurich labs does not require standby power for storage, but only when there is a read or write operation, Anacker said.

In addition, IBM has built a 250-mil chip with a 7 nsec access time and 2,000 single flux quantum cells, coders and drivers.

Such a memory could contain 16,000 bits if fully populated, Anacker said.

With the new technology comes challenges in packaging, he noted. The pin density for JJ technology would be about 1,000 contacts per square centimeter. Because the pins are so fragile, IBM is experimenting with methods of connecting them. It believes it can make the connections by filling cavities with mercury, inserting the pins and then freezing them to get the equivalent of a solder bond.

Cryogenic Portion

The cryogenic portion of the system Anacker described will contain about 50 liters of liquid helium, a refrigeration unit that recycles the vapor and a remote compressor. The refrigeration will cost about $30,000, he estimated.

Although the total system cost might be more or the same as other high performance systems, performance should be much improved, he said.

Cleaner Handles Magnetic Tape

CHATSWORTH, Calif. — Data Devices International has added a magnetic tape cleaner to its product line.

The Mark V comes with an unconditional lifetime guarantee for its self-sharpening rotary cleaning cylinder. The unit also offers an automatic packer arm to maintain a constant tension during winding.

This, the vendor claimed, eliminates tape stretching, cinching, feathering and creasing.

Available Options

Options for the unit include:

- A footage counter to measure the distance between the beginning-of-tape and end-of-tape markers.
- An erase station and a header protection that delays erasing until the header information has been saved.

The Mark V operates with either IBM or National Association of Broadcasting (NAB) reel hubs. The hubs are interchangeable.

The cleaner will accommodate .5-, .75- or 1-in. tape widths, the vendor said. It costs $2,995 from Data Devices International at 20235 Bahama St., Chatsworth, Calif. 91311.

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Despite Slow Speed of CPU

Silicon Valley User Happy With Old Mainframe

By Howard A. Karten
CW Staff

SUNNYVALE, Calif. — Although this city in California's Silicon Valley is often associated with the latest — indeed, the future — in computer technology, at least one technology company is happily using a 10-year-old mainframe.

At a time when users everywhere are hungrily crying for more and more computer power, the Westinghouse Marine Division (WMD) of Westinghouse Electric Corp. still has ample room for growth on its Burroughs Corp. B6700. In fact, the division has been able to actually reduce its use of the system in the past five years without adding an additional computer, according to Larry P. McQuown of WMD.

"Five years ago, we ran two and a half shifts six days a week; now we run two shifts five days a week," he said. Even though the system is slower than later computers, this efficiency has been accomplished by rearranging the schedule, reprogramming some jobs and considering alternatives, such as microfiche, to traditional methods of doing things.

The B6700, which WMD has had for nearly nine years, has 262K 48-bit words of memory, four tapes and a mix of disk drives. Although he's had the system since its heyday, McQuown expects that his firm "can get another two to five years out of it — if we don't have any desire for peripherals that won't outstrip the capacity of the multiplexor channel."

Are there any particular problems associated with using a mainframe that old? "We have no problem getting programmers or support. We are getting some age failures as some of the cables and wires in the backplane get brittle, but that's fairly easily diagnosed and found during preventive maintenance.

"The only problem we see is that some of the newer peripherals are too fast for our old multiplexer and cannot be retrofitted," McQuown commented.

Although the computer itself performs well for WMD, the division did have a small problem recently involving an uninterruptible power supply (UPS) it had installed as a preventive measure in the face of the anticipated brownouts in the area.

"A guy on a backhoe at the installation was out digging a ditch on the back 40 and happened to chop his [machinery] teeth into the 4,000 feeder cable. The UPS didn't know what to make of it and just shed the load," McQuown explained.

"The backhoe operator doesn't want to go back to backhoe work any more. We have an open position for a backhoe operator."

Amdahl Aids Measurement

(Continued from Page 45)

unit must be connected within 12 feet of a mainframe.

The HMI will probably have little impact on software measurement tools, according to an observer familiar with both means of measuring, since hardware and software monitors are not in direct competition.

A note of caution on Amdahl's statement that its processors exceed the speed of most commercial hardware monitors was sounded by Dick Hatton, vice-president for field operations of Tesdata Systems Corp. in McLean, Va. Hatton, whose firm makes hardware monitors, said his company's devices can measore almost all commercial computers made today, although Amdahl may be looking to the future with the HMI.

"As systems get more and more [into] large-scale integration and as the signals become shorter and smaller, [physically] getting a probe in there is going to be more and more difficult," Hatton explained. "This device was not necessary because the signals are faster in any system being brought out now, but in the future this is the way the industry will go."

IBM brought out a similar interface late last year, Hatton stated. One of Amdahl's motivations in bringing out the HMI might be to improve its competitive position somewhat vis-a-vis IBM and Univac, he speculated, perhaps — or particularly — because of federal requirements.

The federal government already has certain procurement requirements that require an independent interface for measurement, and Univac had one "way before IBM," Hatton said.

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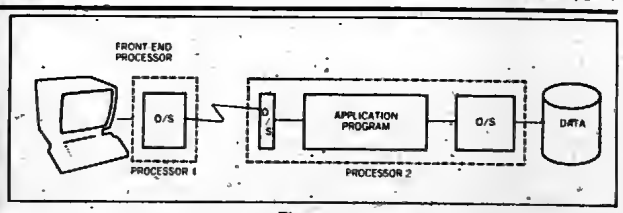

Figure 1

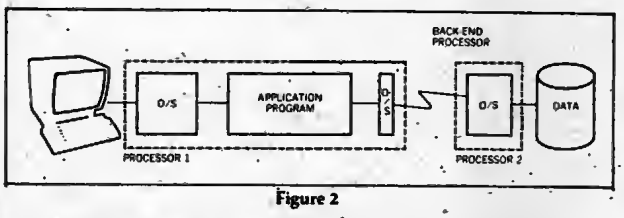

Figure 2

Splitting the Function Flow

(Continued from Page 45)

run unchanged in a distributed environment.

Figure 1 shows a "back-end processor" view of the application flow. Generally, the disadvantage of this approach is that there is usually a very high level of communications between the application and the data management portion of the operating system. This is because there are typically many calls to the data base for each incoming message from the terminal.

In this approach, it is difficult to achieve a reasonable load balance between the two systems. In data base/-data communications systems such as IBM's IMS and CICS, the communications and application parts of the processing usually represent a comparatively small fraction of the total required capacity.

Nevertheless, this back-end processor approach to partitioning has appeal in cases where multiple nodes use the back-end processor for access to common data.

I am not aware of any practical situations where a back-end processor that is used exclusively for data access provides a price/performance advantage. Generally, the overhead of communications between the two systems dominates any advantage.

Front-End Processor

In Figure 2, the flow in the operating system elements is split between the terminal and the application, yielding a partitioning that creates a front-end processor. In this case, the communications between the two systems takes the form of incoming messages (or requests) and outgoing responses.

This approach has the advantage that the communications required in this leg of the flow is relatively small compared with the back-end processor situation. Generally, the problem with this approach is to find enough work for the front-end processor so the load on the processor running the application is significantly reduced from the single-processor case.

Two Ways to Split

There are two generic ways that applications can be split across two or more systems in a DDP environment. These two techniques can be used in combination in much the same way that series and parallel connections of electrical components can be used to implement any electrical circuit.

The distinction to be drawn has to do with whether two systems relate as peers or in a master/slave combination. Peer distribution is termed "horizontal distribution" and master/slave distribution is termed "vertical distribution."

In horizontal distribution, each of the nodes has essentially the same function. Usually, the difference between the functions is in the instances of data stored on each of the nodes and the particular set of terminals to which they are connected.

System Communications

Communications between the systems take the form of program-to-program requests and responses in both directions. These communications are minimized because of relationships that exist among the terminals connected to a particular system and the data stored there.

As an example, consider two nodes used for retail credit authorization. Assume that each node is assigned to cover a particular geographical area. Terminals for each area are connected to their corresponding node, along with the stored data that reflect the account status of the card holders for that area.

The amount of communications between the two nodes depends heavily on whether a shopper from one geographical area is shopping in an establishment whose data is maintained in the other node.

A vertical arrangement has the terminals on one node — usually the smaller one — with another node upstream. In this scheme, data for relatively simple and/or more common functions is kept on the nodes connected to the terminals.

The application would be designed so the bulk of the transactions originating in those terminals is handled by the local system. The only requests sent to the remote node would be the more complex ones, or those requiring data stored on the upstream node.

An example of vertical distribution is an application that maintains a local warehouse inventory on-site. Items not in stock locally would require the transmission of inquiries either to a machine servicing another warehouse or to a central location to see if the item is available elsewhere.

Scherr is manager of distributed systems programming with IBM's Systems Communication Division in Kingston, N.Y. This article has been adapted from Vol. 17, No. 4 of the IBM Systems Journal *with the permission of its editor.*

By Cutting Memory Prices

Harris Revamps Systems 100, 500, 800

FORT LAUDERDALE, Fla. — By unbundling its virtual memory hardware packages and lowering the cost of memory and a number of peripherals, Harris Corp. has restructured its Series 100, 500 and 800 machines and reduced total system prices up to 25% in some cases.

The firm now has three "customer-flexible" systems, each with a CPU, base memory and assorted operating software. The entry-level Harris 100 offers 192 bytes of real memory expandable to 768K bytes, 6M bytes of virtual memory, a system console, power supply, chassis, priority interrupts and a four-language operating system.

The basic package costs about $45,000, approximately 6% less than the previous price for a comparably Harris configured system, a spokesman said.

The Model 500 offers 192K bytes of real memory expandable to 3M bytes and all the other features of the basic System but it supports up to 12M bytes of virtual memory and costs about $99,600, or 15% less than a similar system previously.

The top-of-the-line system 800 comes with 384K bytes of memory expandable to 3M bytes and also sports 12M bytes of virtual memory. The price of this system, however, is approximately $155,200, which is about 18% less than previous prices, the spokesman noted.

The Model 800 featuring a hardware-based floating-point processor and a separate maintenance aid processor that facilitates system self-diagnostics, he added.

Designed for multiuse environments, the System 100 can support up to 32 terminals, the 500 can handle up to 64 users and the 800 can accommodate up to 128 work stations.

A large part of the virtual memory system price structuring centers around Harris' lowering of the price of memory. For instance, while a 192K-byte base module pre-

(Continued on Page 54)

Nationally Active Credit Union Runs on 'Very Small' System

Special to CW

BLOOMFIELD, CONN. — There are no teller windows or teller machines at the Automotive Service Councils, Inc. (ASC) Federal Credit Union here. And few of the credit union's members come to the office.

Instead, most business transactions are conducted by mail and telephone because the 1,400 members — who are owners or employees of automotive repair businesses — are located in various parts of the U.S. Less than 1% live within 50 miles of Bloomfield.

Steadily increasing volumes of transactions led ASC Federal to choose a "very small" computer system and credit union program products early in 1978 to handle processing of accounts, to have immediate access to member account information and to generate management reports at the time they are needed, according to Norman Cohen, ASC Federal's treasurer.

Cohen now feels the credit union is prepared to handle the additional processing re-

(Continued on Page 54)

PDP-11 Users Gain Cache, Controller

IRVINE, Calif. — Plessey Peripheral Systems has introduced both a high-speed 1K-word cache memory and a microprocessor-based disk controller for Digital Equipment Corp. PDP-11 systems.

The PM-KK11A cache memory is a direct replacement for DEC's KK11A board and resides next to the PDP-11/34A's CPU. Designed for use with or without the machine's floating-point option, the memory captures data from the Unibus during main memory-to-CPU transfers and holds the data used most often by the program, a spokesman explained.

Since the cache contains the required data about 85% of the time, approximately 500 nsec of transfer time is saved with MOS memory and 700 nsec are saved with core.

Disk Controller

The PM-DC1100 disk controller emulates DEC's RP11 and RP02/RP03 disk subsystems. Capable of handling up to two storage modules of 80M or 300M bytes, it can accommodate op to eight modules using the firm's multidrive interface chassis.

The PM-DC1100 controller costs $3,230 while the single-board cache memory is priced at $2,984. Quantity discounts are offered, Plessey noted from 17466 Daimler, Irvine, Calif. 92714.

Memorex Builds Line Printer For System/34, System/38

SANTA ANA, Calif. — Memorex Corp. has unveiled an impact line printer for all models of IBM's System/34 and System/38 that features a 760 line/min print speed and a variety of optional character sets.

The Model 3476 incorporates a chain-train transport design that can handle up to six-part paper forms and can accommodate paper sizes up to 19.5 in. The unit also has a tandem forms tractor, paper power ejector, three-way adjustable forms receptacle and a variety of printer status sensors, a spokesman said.

Attachment of the 3476 is made through the System 34 or System 38 workstation controller and the printer is completely transparent to all host CPU operating systems, diagnostics and user programs. The Memorex print controller is housed within the 3476's cabinet.

To facilitate quiet operation, the unit is housed in an acoustical cabinet that allows the printer to be located in environments other than the computer room, Memorex noted.

Available through the company's Business Systems Division, the printer costs $14,500 or can be leased for $497/mo on a two-year lease or $470/mo on a three-year plan. Lease prices include the maintenance fees, the spokesman said from San Tomas at Central Expressway, Santa Clara, Calif. 95052.

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Intelligent Controller Ties DEC Micros to Disk, Tape

ANNAPOLIS, Md. — An intelligent controller that interfaces the Digital Equipment Corp. LSI-11 family of microprocessors with either Winchester disk or high-density cartridge tape has been announced by United States Design Corp.

The UIC-11 direct-memory access (DMA) controller contains a microcomputer with 16K-bytes of random-access memory (RAM) and 2K bytes of read-only memory, according to the firm. A signal adapter and microcode software are said to enable the controller to support either the International Memories, Inc. 11M-byte Winchester disk or the Data Electronics, Inc. (DEI) 14.5M-byte cartridge tape.

The 16K-byte RAM is a cache, or buffer, for all input and output between devices and the LSI-11, reducing sequential access times and device overhead, the firm claimed.

Controller microcode provides error handling to increase data reliability, and the controller requires one dual-width slot on the LSI-11 Q-bus.

The UIC-11/tape combination is said to support random access and the replacement of blocks on the DEI tape drive. For special applications, an LSI-11 computer system can be run entirely on tape.

The UIC-11 controller for either device costs $1,995 from Suite 102, 100 Severn Ave., Annapolis, Md., 21403.

Prime Introduces Two Matrix Line Printers

WELLESLEY, Mass. — Prime Computer, Inc. has added two Printonix, Inc. matrix line printers to its peripheral offerings, one with a serial and one with a parallel interface.

Both operating at 300 line/min, the printers use a raster/dot matrix printing technique that overlaps dots of uniform density for characters that appear to be fully-formed and can be read by an optical character recognition (OCR) scanner, according to the firm.

Although the printers feature a standard 96-character Ascii set, they can be configured through programmable read-only memory (Prom) with user-selectable fonts containing up to 160 characters. There is no speed loss for multiple selections, the firm claimed.

Serial Interface

The low end of the line is a printer with a serial interface that offers remote printing and full plotting capabilities, according to the firm. The printer produces a 96-character Ascii set in a 9 by 7 dot matrix (9 by 9 for lowercase characters with descenders) and supports 132-col widths. The device plugs into any standard RS-232 interface.

The printer with parallel interface also prints a 96-character Ascii set at 300 line/min and uses 9 by 7 or 9 by 9 matrices. In the plotting mode, the density is horizontally 60 dot/in. and 72 dot/in. vertically.

With the parallel interface printer comes a Prime-manufactured dedicated controller and all cabling.

The Serial interface printer costs $7,500 and replaces a 125 line/min, 96 character serial printer without remote printing capability priced at $7,700.

The parallel interface printer is priced at $8,500, including controller and cabling, and replaces an $11,000, 165 line/min, 96 character line printer.

Both printers will be available in November from Prime Computer at 40 Walnut St., Wellesley Hills, Mass. 02181.

Course to Cover HP 9800 Series

FORT COLLINS, Colo. — Classes in programming and the operation of Hewlett-Packard Co.'s HP 9800 series of desktop computers will be held at the HP factory and at a number of HP sales offices in the U.S. this fall.

System 35 and System 45 training will include instruction in the use of the keyboard and CRT, special function keys, mass storage media and devices and other system operations. In addition, System 45 users will gain knowledge in graphics and digitizing.

System 35 classes will be held Oct. 8 and Nov. 19, and System 45 classes will convene on Oct. 8. System 35 Assembly language classes begin Oct. 15.

The classes cost $500 each and last five days.

Class on 9825A

The 9825A class will give persons with or without programming experience an introduction to programming methods as well as information on features of the 9825A and HPL language. The five-day course is scheduled to begin Oct. 15 and costs $500.

Instruction in Basic programming, scheduled to start Nov. 5, will emphasize general programming techniques along with flowcharting and writing and debugging programs. The course was designed for persons who either have no programming experience or whose experience does not include Basic. Cost of the four-day course in $400.

Course prerequisites, purposes and contents are contained in a free brochure, "Programming Courses — Fundamental Tools for Problem Solving," available from HP at 1507 Page Mill Road, Palo Alto, Calif. 94304.

Give us your slogans, your thoughts, your witty-one-liners yearning to breathe free.

Enter the 1980 Computerworld button contest.

Every year, as all you button freaks know, Computerworld distributes tens of thousands of buttons (at no cost, we like to point that out) at NCC: the Computer Expos and other trade shows across the country. A whole generation of computer people have come to look for these buttons, and they have become a tradition in the industry.

This year, we're going to give you a chance to participate in the tradition. We're looking for good button suggestions — funny, relevant and at least moderately clean — for consideration by our experienced panel of judges. (Examples of buttons we've used are shown.) As many as six suggestions will be chosen by our judges (based on criteria known only to them), and if your entry is among those picked you will receive a certificate of appreciation suitable for showing off to your friends.

In addition, all the people who submit winning entries (including all duplicate entries) will be thrown into a hat (or at least their entries will) and six lucky winners will be drawn more or less at random (we never said the judges were fair). These six lucky souls will receive a free hand-held computer game valued at well under $100 if we can do it.

You may not enter as many times as you like because we know you have computers and can run off huge numbers of entries which will drive us crazy. So only two entries are permitted per person and all entries must be received on the official order form or a copy thereof. All decisions of the judges are considered final, and no representation as to their competence, skill or fairness are being made. Deadline for entries is November 15th 1979 in our offices in Newton.

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Features Parity-Generation

Intel Board Expands Nova Addressable Memory

SANTA CLARA, Calif. — Besides providing additional memory for Data General Corp. Nova 3 minicomputers, Intel Corp.'s add-in board also offers parity-generation and checking functions as well as a memory management and protection feature.

The 5160 plugs into one of the available Nova 3 slots and contains all memory, control logic, address logic, bus drivers and voltage regulator circuitry. The unit stores up to 25K bytes and is said to allow Nova machines to be configured with the maximum addressable memory.

Error logging and display, error checking with single-bit correction and double-bit detection and other optional features that were previously unavailable or available only on extra boards are also provided.

The board's memory manager and protect unit (MMPU) reportedly lets the boards address the largest storage capacity that can be handled by existing user software. The MMPU permits system expansion to 256K bytes (or 128K words), and the protect feature guards memory storage and retrieval from major software violations, a spokesman noted.

In single quantities, the memory board, with 256K bytes, MMPU, error-check circuitry and error logger, costs $6,950. Intel is at 3065 Bowers Ave., Santa Clara, Calif. 95051.

Turnkey System Built For Doctors and Dentists

SANTA ANA, Calif. — A turnkey data management system intended for doctors and dentists is available from Professional Accounting Machines, Inc.

The Medac 310 comes with all hardware, software, customized I/O forms, methods and procedures, the vendor said.

The desktop system consists of a central-parallel interactive and batched processor, a CRT terminal, a 1,200 word/min printer and a dual-disk storage module.

All patient service and accounting operations required by health care specialists are handled by the system. Medac 310 services and reports include patient billing; insurance claim preparation; accounts receivable aging, daily and monthly financial summaries; day sheets; bank deposit slips; daily appointment calendar; and patient account listings for single or multidoctor offices, according to the vendor.

The Medac 310, can also be modified to fit special office needs and costs $17,900, the vendor said from 1630 S. Lyon St., Santa Ana, Calif. 92705

Device Cleans Philips-Type Tape

TARZANA, Calif. — A digital cassette tape cleaner, compatible with Philips-type cassettes, has been announced by Innovative Computer Products (ICP).

The Model 100 Utilizes ICP's proprietary CS-25 cleaning solution in conjunction with a lint-free pad strip to clean the oxide surface of the tape.

In addition, a low-angle ceramic blade is said to remove any partially imbedded foreign matter not trapped by the pad.

The compact unit weighs less than 10 lbs and sells for $360 from 18360 Oxnard St., Tarzana, Calif. 91356.

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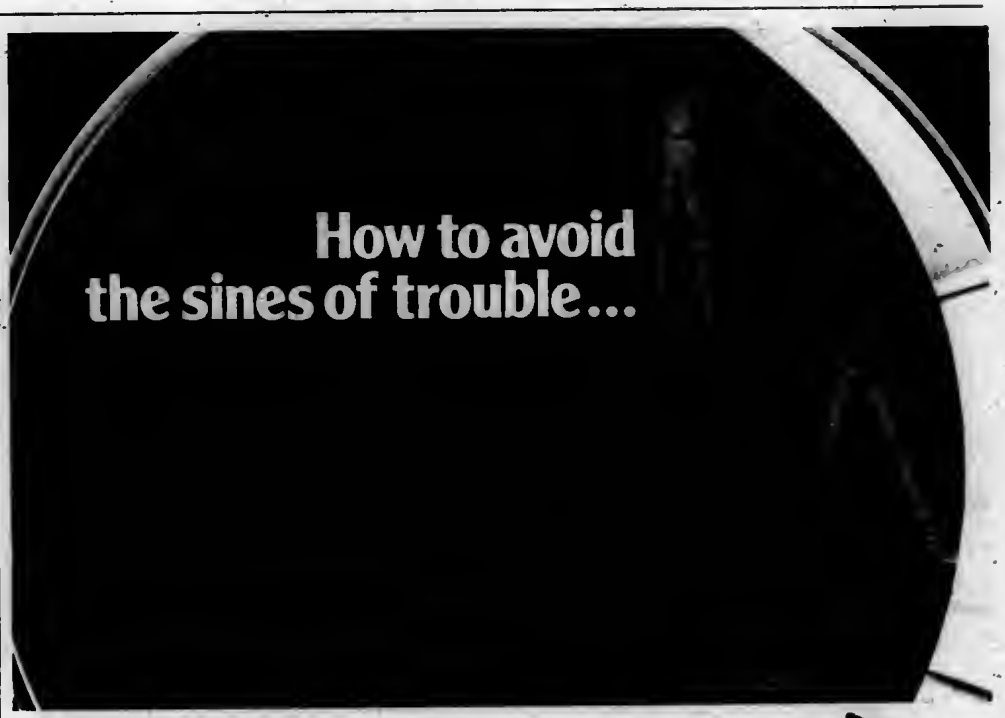
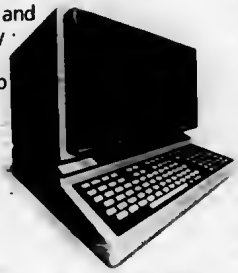
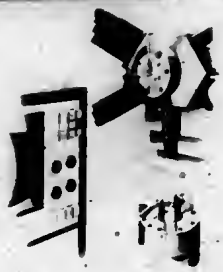


Electrical and electronic equipment—computers to N/C machines—must be operated at rated voltage for peak performance and reliability. Fluctuating power can cause erratic operation and damage components. Equipment failure, substandard operation and reduced equipment life are the result.

The sensitivity of computers and peripherals can cause plenty of headaches. The inrush of start-up current can spike up to ten times the operating amperage. Memory and programs are lost, schedules jammed and hardware damaged.



Numerically controlled machines are subject to line voltage fluctuations in the power distribution network. And they operate in an electrically noisy environment. Equipment damage, production problems and downtime are the common result.



Fortunately, these sines of trouble can be avoided with power conditioning equipment from Superior Electric. STABILINE® Power Conditioning Equipment can help you regulate incoming voltage, reduce downtime and protect against erratic operation. For more information and applications assistance, call Joe McMahon at The Superior Electric Company, Bristol, CT, 06010, (203) 582-9561.

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Credit Bureau Operates on 'Very Small' System

(Continued from Page 51)

sulting from new membership and increased activity coming in from the credit union's members, who are also members of the ASC, a national trade association of automotive repair businesses.

Both owners and employees of three businesses may join ASC and be eligible to join the credit union.

Common Interests, Resources

ASC, formed in 1972, consists of three Automotive Service Councils representing different segments of the automotive repair industry — body repair, mechanical repair and transmission repair. These businesses must obtain at least 50% of their revenues from automotive repair to qualify for membership.

ASC Federal was formed when the need for credit union services was recognized by members of ASC, Inc. Automotive repair business employees do not have access to the benefits of a credit union through their places of business because the average repair facility has only four employees.

"The trade association is a pooling of common interests; the credit union is a pooling of common resources," Cohen explained.

When the credit union was chartered, business transactions were handled with a manual posting system in conjunction with batch processing by an outside company. "That was economical and practical at first, but the reports were received were never up-to-the-minute," Cohen said.

With the surge in memberships and account activity in the last two years, Norman Cohen and Dorothy Cohen, ASC Federal's assistant treasurer, reviewed several options and discussed their problems with management personnel of other credit unions.

They found that the Burroughs Corp. B80 and Credit Union program products matched their current and future needs and were very affordable for a small credit union. "We now have flexibility along with cost-saving operations. Independence to run our own 'show' was a dream made possible by the B80," Norman Cohen observed.

Separately, Dorothy and Norman Cohen attended Burroughs customer education schools to learn B80 concepts and operation and the use of the program products. Dorothy Cohen, who is the principal B80 operator, said, "I didn't know anything about the B80 when I went to school. But with guides at my fingertips, I'm finding it a cinch to operate."

Norman Cohen added, "The schools were very fine. Excellent. But I should have attended before the system was installed, not afterward."

Invaluable Reports

In addition to processing some 10,000 deposit, withdrawal and loan transactions quarterly, the B80 is providing daily or monthly reports that the Cohens find invaluable.

"The reports we get are fantastic, and the statistical report is best," Dorothy Cohen said. This report, produced on demand, shows analysis information including the number of accounts, the share and loan accounts by increments (under $500, $500 to $1,000 and so on) and how many dollars are in each of two groups: individuals and ASC, Inc. units.

Reports are vital for planning future activities and making projections, according to Norman Cohen. The credit union is planning a share certificate (long-term deposit) program, and the Cohens want to generate new deposits rather than just shift current deposits into share certificates.

The B80 provides analyses of account activity and of member ages. "We can expect that if a member is 60 years of age, there will probably be a record of continuing deposits and the money is likely to stay put," Norman Cohen said. "If the member is 45 years old or younger, the money is continually moving around and is not a good candidate for a long-term deposit.

"Reports which reveal this information are very important management and marketing tools," he said.

System Features

Another important feature of the credit union programs is automatic daily computation of interest and dividends. ASC Federal uses the day-of-deposit/day-of-withdrawal method of compounding interest daily, which is attractive to credit union members who want the maximum return on deposits.

Equally important is automatic daily posting of deposits, withdrawals and loans. "What I like very much about the machine is that it figures interest automatically to the day, on a 30- or 31-day basis. This was done manually previously," Dorothy Cohen noted.

Among other applications and reports are daily trail balance; a list of new members each month; new loans with relevant information such as amount, kind and purpose; and closed accounts for loans and shares.

The B80 used by ASC Federal is equipped with Burroughs "super minidisk" (with 2M bytes of capacity) for storage of data and random access to records, a Selfscan CRT and a 180 char./sec console printer that operates bidirectionally.

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Harris Cuts Memory Price, Revamps Three Systems

(Continued from Page 51)

viously costs about $9,450, the same unit is now priced at $2,880, or approximately $15,000 per 1M byte.

According to the spokesman, the new memory prices reflect the firm's use of 16K memory chips and its planned early introduction of 64K-byte chips using the same memory boards.

Besides the 192K-byte increments, memory is available in 48K-, 384K-, 768K- and 960-byte modules.

Among the peripherals reduced in price:

- 40M-byte, 80M-byte and 300M-byte disk drives now cost 16%, 15% and 14% less respectively.
- The firm's high-density tape drives were reduced by about 27%.
- The price of printers was lowered an average 10%.

With all the memory, peripheral and restructuring moves, a typical System 100 with 192K bytes of memory, 300 line/min printer, 40M-byte disk drive with controller, 45 in./sec tape drive, direct memory access communications processor and required channels costs $102,600.

A similar System 500 with 576K bytes of memory, a 600 line/min printer and a 80M-byte disk drive costs $176,200. A System 800 with 1.3M bytes of memory, a 900 line/min printer and a 300M-byte disk drive sells for $296,650.

Additional restructuring information can be obtained from Harris at 2101 W. Cypress Creek Road, Fort Lauderdale, Fla. 33309.

No Larger Than Pocket Calculator

Unit Converts Phone for Use by Deaf

By Jeffry Beeler
CW West Coast Bureau

SAN FRANCISCO — A communications "terminal" barely larger than a pocket calculator promises to eliminate many of the obstacles that traditionally have prevented the deaf from engaging in phone conversations with people with normal hearing.

A prototype of the intelligent product, christened Tele-Ear, was described at the recent Wescon/79 conference here by its inventor, Daniel V. Mericle, a student at the University of New Mexico.

Though not suitable for deaf people with severe speech handicaps, the unit represents a "big step forward" in long-distance communications for the hearing-impaired, Mericle said.

Compared with existing long-distance communication aids for the deaf, the microprocessor-based Tele-Ear offers improved portability, increased privacy and lower costs, he stated.

To date, most long-distance communications involving the hearing-impaired have taken place, either through teletypewriters or human interpreters. With prices from $400 to $2,000, however, teletypewriters have proved beyond the reach of most individuals and have been useful only for communications with other teletypewriter owners.

Interpreters also have their drawbacks. They are not always available, and their presence sometimes constitutes an unwanted intrusion in private conversations.

Tele-Ear is projected to cost between $200 and $250 and can be used in any long-distance call involving a touch-tone telephone. Thus, a hearing person would need no special equipment to converse with a Tele-Ear owner.

The unit connects to any telephone (touch-tone or not) through an acoustic couple or an inductive pickup. When placing a long-distance call, a deaf individual would speak into a telephone receiver in the normal fashion, and the hearing person on the other end of the line would reply by typing the appropriate characters on his touch-tone keypad.

Tele-Ear would then receive the touch-tone phone's signals and translate them into characters before flashing them on a 16-segment alphanumeric display panel, Mericle said.

The heart of the unit consists of a Mostek Corp. 3870 microcomputer chip using the Fairchild Camera & Semiconductor Corp. F8 instruction set. Other major Tele-Ear Components include a 2K-byte read-only memory for storing Ascii character code, a 64-byte random-acess memory (RAM) scratchpad and a 5V power supply.

Micro Minimized

With this issue, *Computerworld* is ending its Microcomputing section.

To best serve CW readers in the future, newly introduced micro-based business systems will appear in the pages of the Miniworld section.

Software written for microcomputers will be found in the Software & Services section.

Intelligent Graphics System Available for Apple Users

CUPERTINO, Calif. — The Graphics Tablet from Apple Computer, Inc. gives Apple users graphics capabilities ranging from the digitizing of circuit-board schematics to the creation of high-resolution, multicolored original art.

Once installed, the tablet, equipped with a

The Apple Graphics Tablet

standard software package written in BASIC is ready to use. The package allows users to customize the tablet with special symbols and functions.

The Graphics Tablet features an 11-in.-by-11-in. drawing surface, a coated mylar overlay containing the menu of tablet functions, a drawing pen, disk-based software and a printed circuit interface card that plugs into the Apple computer.

Combined with the Apple II, the Apple Disk II and any television set or video monitor, the Graphics Tablet forms a high-powered graphics system, according to the vendor. Freehand drawing is possible with this arrangement; almost no lag time exists between the stroke of a pen on the tablet and the appearance of a mark on the screen.

Artists can create and perfect their work in any of six high-resolution colors — black, white, magenta, green, orange and blue. Any portion of the work can be modified without recreating the entire picture, and several variations of a drawing can be generated and stored on the Disk II for comparison and modification, the firm said.

Several functions accommodate fine-line and detailed drawing tasks, the firm said. The calibrate fonction maps a portion of the tablet to the full size of the monitor, allowing users to enlarge very minute drawings such as circuit-board schematics and chip masks.

With the Viewport function, users can section off an area of the screen image. Any changes made to the drawing will affect only that specific area. Using the Reduce function, users can employ the entire tablet surface for working on the sectioned-off area. This capability allows gross hand motions to perform accurate and easy drawing changes that would otherwise be much more difficult, according to the firm.

Users can also place a map, blueprint or any other schematic directly on the tablet and trace its surface. The tablet also allows users to create a multicolored illustration and then strip out individual colors, saving each color separation in the process.

(Continued on Page 56)

For Cromemco Users

Graphics Interface Introduced

MOUNTAIN VIEW, Calif. — The Super Dazzler Interface (SDI) recently introduced by Cromemco, Inc. is a high-resolution graphics interface designed for Cromemco microcomputer systems.

The SDI can display color or black-and-white images with up to 756- by 484-point resolution, according to the firm. The circuitry is contained on two cards.

The SDI uses direct-memory access (DMA) to display the contents of a display memory. One part of the picture may be displayed in one mode and another part in the other mode. In addition, 12K- or 48K bytes of memory can be used, leading to four basic modes of operation, the firm said.

The SDI has three separate analog output signals and, in black-and-white work, any of these outputs can be used to drive black-and-white monitors. All three outputs can display three different pictures to three different black-and-white monitors simultaneously, the firm claimed.

A composite sync signal is switch-selectable on any of the three outputs. The Sync signals adhere to the RS-170 standard for the television broadcast industry, Cromemco noted.

A two-port memory card has been developed for use with the SDI. Picture information is accessed through a connector on the top of these cards, according to the firm. Three 16K-byte, two-port memories hold a full 48K-byte picture.

The two-board SDI costs $595 and the 16K-byte, two-port memory card — the Model 16KTP — costs $795 from Cromemco at 280 Bernardo Ave., Mountain View, Calif. 94043.

'Metafile' Works On 8080 and Z80

BRIDGEPORT, Pa. — Don McNeil, information systems consultant, is offering the Metafile information system for use on 8080 and Z80 microcomputers under CP/M.

Metafile provides data entry, data management, inquiry, computation and reporting facilities. Applications including client accounting, inventory management and generalized recordkeeping can be performed without the need for any user-generated programs, the firm said.

Metafile operates on standard CP/M systems having 32K bytes or more of main memory and at least one direct-access device. The software is available on Micropolis Corp. quad-density diskettes.

Documentation and machine-readable materials are included with the package, which is being offered at an introductory price of $100. Documentation alone sells for $25. D.H. McNeil is at 303 8 St., B-3, Bridgeport, Pa. 19405.

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Interface Card Expands Intel Development System

EUGENE, Ore. — A device that expands the Intel Corp. SDK-85 development system by adding an STD bus expansion system has been developed by Hilbert Systems Ltd.

The HS008 SDK-STD interface card allows the operator to use all the debug and single-step functions of the SDK-85 to develop his own cards and programs for the STD bus.

The Interface card was designed to interface between the signals generated by Intel's SDK-85 development system and the 56-pin STD bus by mass termination cabling. This facilitates designs using the STD bus and expands the capabilities of the SDK-85 system by providing the advantages of the working hex keypad and display functions, the CPU random-access memory (RAM) and the read-only memory (ROM). In this way, the user can investigate, debug and exercise new designs for the STD bus, the firm said.

The SDK/STD Interface card costs $70/card and includes the manual and SDK-85 application notes for bus expansion. Ribbon cable is available, and two-ft. connectors cost $45 a pair.

Hilbert Systems can be reached at P.O. Box 3690, Eugene, Ore. 97403.

Invoicing System Unveiled For Use With TRS-80

SAN RAFAEL, Calif. — An invoicing system designed to interface directly with the Osborne & Associates accounts receivable system for the Radio Shack TRS-80 microcomputer is now available from Taranto & Associates.

The invoicing system allows the user to enter sales items in the system — picking up the customer's name and address from the accounts receivable system file — compute sales taxes and print the invoice on one of two available preprinted forms, the vendor stated. Completed invoice transactions are automatically transferred to the accounts receivable system for accounting, using full reporting functions.

The invoicing system is available to users for $99.95. The 50-page documentation book is priced separately at $10. The invoicing system can be used only in conjunction with the accounts receivable system.

Taranto & Associates can be reached through P.O. Box 6073, 4136 Redwood Hwy., San Rafael, Calif. 94903.

Printer Interface Debuts

CANOGA PARK, Calif. — An I/O interface card that allows users of the Apple Computer, Inc. Apple Computer to interface directly to the Malibu Design Group, Inc. Model 165 dot matrix printer has been introduced by Malibu.

The I/O card enables the user to print the entire 96-char. Ascii set using standard Apple programming techniques. The user can define his own character set under program control.

In addition, a simple CALL will transfer and print the contents of either the Standard Apple high-resolution display page or the standard page expanded two times in normal or inverse mode.

The card costs $260, complete with cable and instruction manual from Malibu at 8900-G Eton Ave., Canoga Park, Calif. 91304.

Apple Graphics Upgraded

(Continued from Page 55)

This saves both time and expense in producing color separations for printing and illustrations, Apple noted.

Standard Function Menu

The tablet has a standard menu of functions. Users select a function by touching the drawing pen to the overlay surface at the appropriate locations. For example, if a user wishes to create a rectangle, he can touch the pen to the menu section labeled "Box." To create the box, the user touches the pen to the drawing area at two distinct points. The tablet will produce a rectangle using the two points as diagonal references for the box's length and width.

The software routines are written in Applesoft Basic. With the routines, users can alter, eliminate and add new functions such as standard shapes, colors and symbols, according to the firm.

The plug-in interface card contains 2K bytes of read-only memory (ROM) firmware. Hardware requirements for operating the tablet include an Apple II or Apple II Plus computer with Applesoft Basic and 48K-bytes of random-access memory (RAM), an Apple II floppy disk drive and a television set or video monitor. Users can connect printers to the systems to obtain hard copies of their graphics.

The Graphics Tablet costs $795 from any Apple dealership. Apple headquarters is at 10260 Bandley Drive, Cupertino, Calif. 95051.

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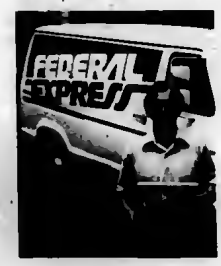

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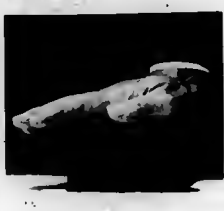

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'Whatsit' Update Released

SAN FRANCISCO — Computer Headware, Inc. has issued Release 2, an update of its Model A-1 "Wow! How'd All That Stuff Get In There?" Whatsit self-indexing query system for the Apple Computer, Inc. Apple II microcomputer.

Responding to "Pidgin English" requests, Whatsit answers direct questions at conversational speed by cross-referencing data entries in disk storage.

Whatsit's open-ended data structure evolves continuously as the system is used, and unexpected new file headings are instantly added when first mentioned, remaining available for future reference, the firm said.

Self-Prompting Command

A "What's Next" request, new in the Apple model, switches on automatic self-prompting.

Release 2 is available in both 48K- and 32K-byte versions for the Apple II.

Prices start at $100 from Computer Headware, P.O. Box 14694, San Francisco, Calif. 94114.

Driver Controls Lamps in CRT

FORT WORTH, Texas — An integrated-circuit LED bar and dot display driver that enables the user to selectively control a string of LED lamps in a bar graph CRT is available from Radio Shack.

The LM3914N has 10 adjustable analog steps and a selectable bar or dot display mode.

It can be expanded to up to 100 steps for voltage, power, current or audio displays, the vendor said.

The unit has current-regulated LED outputs and operates on a supply ranging from 8- to 25 Vdc. A similar unit designated the LM3915N and offering 3 db log steps is also available, Radio Shack reported.

Both units cost $3.49 and are available at most company outlets, the vendor said from 1300 One Tandy Center, Fort Worth, Texas 76102.

Range of Micros Gains Memory

WESTLAKE VILLAGE, Calif. — Designed specifically for the Heath Co. Heathkit/Digital H 11 and the Digital Equipment Corp. LSI-11/2 and PDP-11/03 microcomputers is Chrislin Industries, Inc.'s CI-1103 memory module.

The memory features an 8K-by-16-bit dual-width board using 200 nsec 16K dynamic memory devices. The unit, which plugs directly into the microcomputer, is available with either on-board distributed refresh or external refresh control logic. Data access time is 300 nsec and cycle time is 525 nsec.

On-board memory is available in 2K increments up to 128K words of memory.

The CI-1103 costs $750 from Chrislin Industries at Suite 102, Via Colinas, Westlake Village, Calif. 91361.

Heath Users Get CP/M Package

NEW YORK — Lifeboat Associates has released a CP/M package for the Heath Co. Heathkit H17 and H89 disk systems, providing Heath users with a large volume of CP/M-based software.

The CP/M package includes text editor, assembler, debugger and various other system utilities plus six user manuals. The CP/M package operates directly with systems configured for HDOS. Most programs designed to run under CP/M will be available to operate with this system, including Microsoft Basic, Fortran and Cobol.

The CP/M package costs $145 from Lifeboat Associates, 2248 Broadway, New York, N.Y. 10024.

Apple Warranty Extended

CUPERTINO, Calif. — Apple Computer, Inc. is offering a low-cost extended warranty for its Apple microcomputers.

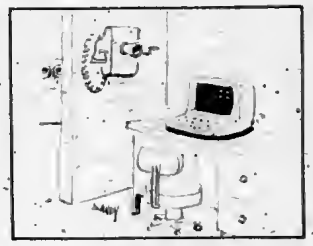
Available now, the one-year extended warranty can be purchased by Apple customers at any of the more than 400 authorized Apple Level I service centers, an Apple spokesman said.

The warranty is being offered for $195 — less than .75% of the monthly cost of a typical system — features same-day turnaround for carry-in repairs, according to the vendor.

The extension covers all systems and products manufactured by Apple as well as any additions made by the customer to the base system during the warranty period.

The warranty program converts maintenance into a fixed cost, reduces repair turnaround time and provides for warranty renewability. The extended warranty may be purchased during the normal 90-day parts-and-labor warranty period.

Apple headquarters is at 10260 Bandley Drive, Cupertino, Calif. 95014.



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Computerworld's October 29th Special Report, *Data Base Management Systems* will give you access to unduplicated information.

Edited by Don Leavitt, in this Special Report you'll see:

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- *The future of DBMS.*

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If you currently use DBMS software, or are planning to buy, this Special Report will be of special interest to you. And if you market DBMS, you'll reach a wide end-user audience here. Ad closing date is October 12th, and your *Computerworld* representative can give you full ad planning assistance. Or, to reserve space for your ad, call Frank Collins at 965-5800.

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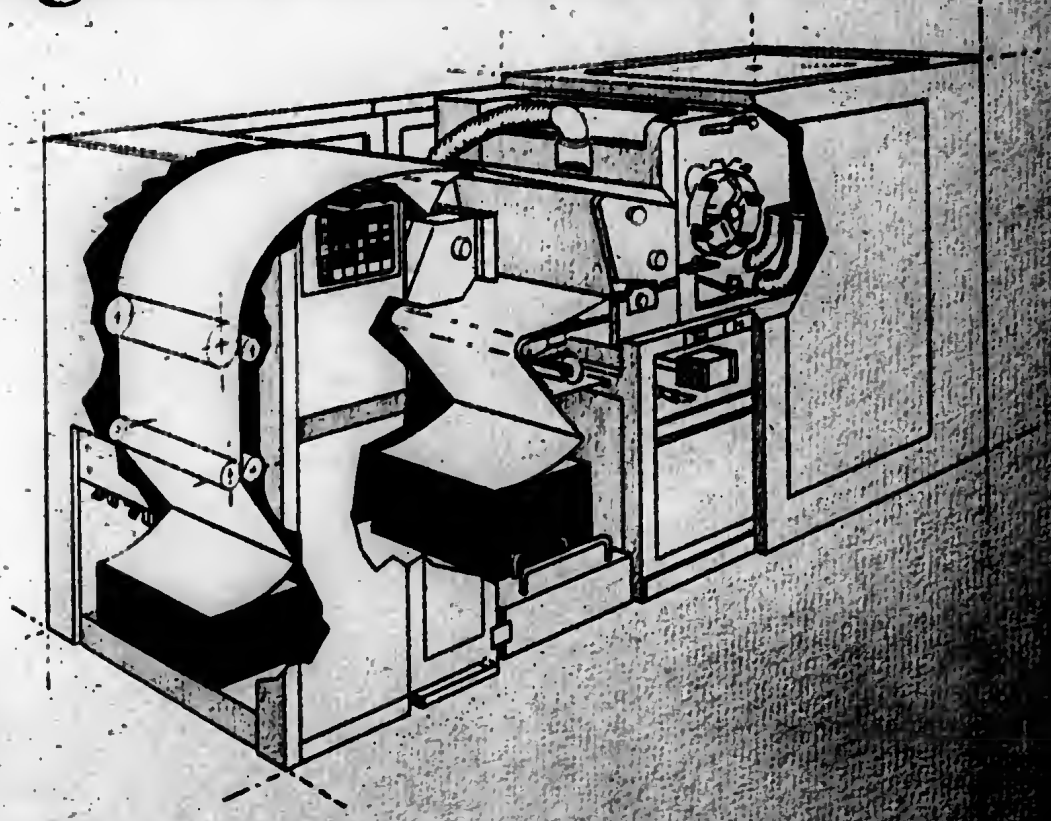

For high volume printing, Itel's 7800 Non-Impact Printing System is faster than any impact printer. Designed and manufactured in a joint effort with Siemens Corporation, the third largest electrical manufacturer in the world, Itel's 7800 operates at speeds of up to 20,000 lines per minute. And the 7800 also outruns in reliability and versatility every other laser printer currently available.

Its short, simple paper path with no sharp turns means there's little chance of having a paper jam interrupt your operations. So you can count on less downtime and rely more on the 7800 for production.

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For 24 and 32 Channels

Micom Unveils Four Concentrators

CHATSWORTH, Calif. — Micom Systems, Inc. has unveiled four models of the Micro800 data concentrator providing 24- or 32-channel configurations.

The Model 8032 provides 32 channels without interface control signals and is suitable for dedicated terminal applications. The Model 8132 provides 32 channels with interface control signals and permits support of dial-up access to each channel. The models 8024 and 8124 provide the same capabilities for 24 channels.

The new models join the current Micro800 product range, which supports from two to 16 channels, the firm said. Prices for the models are $7,150 for the 8024; $7,350 for the 8124; $8,500 for the 8032; and $8,700 for the 8132.

More information is available from Linda Resnick at Micom, 9551 Irondale Ave., Chatsworth, Calif. 91311.

The Micom Micro800

Apple II Emulates Tektronix Terminals

ROCHESTER, Mich. — A read-only memory (ROM)-based device that enables the Apple Computer, Inc. Apple II microcomputer to emulate Tektronix, Inc. 4010 series graphics terminals has been introduced by ABW Corp. of Ann Arbor, Mich.

The "Tektronix simulator" TEKSIM employs distributed processing in its programming approach and uses Apple's high-resolution plotting capabilities, the firm said.

No modification to the host-resident program is required to display or input graphical data. The unit features multi-colored displays, selectable erase and standard video output that lets any television set function as a monitor, according to the firm.

TEKSIM is available for $795 from the marketer, Cybersoft Systems, 301 S. Livernois, Rochester, Mich. 48063.

Micro Guide Published

ROCHELLE PARK, N.J. — A guide on the educational potential of microcomputers entitled *Microcomputers and the 3R's*, by Christine Doerr, has been published by Hayden Book Co.

Designed for secondary school teachers and administrators, the book covers basic microcomputer information and also describes how to organize a computer-based curriculum for different classes in the sciences, English and history. A syllabus and teaching notes for a six-week introductory course on computers and Basic is also provided.

The book costs $7.95 from the publisher at 50 Essex St., Rochelle Park, N.J. 07662.

Multibus Runs On Motherboard

SANTA CLARA, Calif. — Industrial Modules, Inc. is offering a nine-slot backplane/-motherboard that is compatible with the Intel Corp. multibus and features integral termination resistors on all lines to reduce reflections and noise.

The Inmod-99 provides eight slots with .6-in. spacing and one slot with 1.2-in. spacing. The ninth slot provides the extra spacing to accommodate a single board with wire wrap pins.

Vacant Sockets

If alternate sockets are left vacant, the backplane/motherboard can accommodate up to five boards with wire-wrap pins. It can then be used as a prototype vehicle for larger systems, according to the firm.

The Inmod-99, guaranteed for 90 days, costs $115 assembled and tested. Industrial Modules can be reached through P.O. Box 2985, Santa Clara, Calif. 95051.

Game Guide Out

ROCHELLE PARK, N.J. — Twelve Basic simulation game programs are available in a book recently released by Hayden Book Company, Inc.

Called *Stimulating Simulations*, the C.W. Engel book presents each program with a code listing, a sample run, instructions and documentation — which includes flowcharts and ideas for variations, Hayden said.

The programs are entitled Art Auction, Monster Chase, Lost Treasure, Gone Fishing, Space Flight, Starship Alpha, Forest Fire, Nautical Navigation, Business Management, Rare Birds, Diamond Thief and the Devil's Dungeon, the vendor said from 50 Essex St., Rochelle Park, N.J. 07662.

Seminar Set On 8085

SAN DIEGO, Calif. — A four-day seminar on "Microprocessors — Understanding and Applying the Intel 8085" will be offered by Evolving Technology Seminars Oct. 23-26 here.

The hands-on course uses the Intel Corp. SDK-85 microcomputer system design kit. However, students can opt not to use the kit.

The course costs $735 with the kit and $445 without, Evolving Technology said from 3725 Talbot St., Suite F, San Diego, Calif. 92106.

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MBS Introduces Utility, Communications Package

SALT LAKE CITY, Utah — Mini Business Systems (MBS) has introduced a Basic utility called DOC for North Star Computers, Inc. systems and a communications package designed for the CP/M operating system called Intersystems Communication.

DOC aids the programmer in documenting, optimizing and maintaining the confidentiality of programs, the firm said. To protect confidentiality, DOC-enhanced programs can no longer be conveniently listed or edited with standard North Star Basic facilities.

The package supports multiple local or remote terminals and printers that can be interactively logged on and off the system, a spokesman said. The communications package permits communications with other systems through a user-selected RS-232 port.

Intersystems Communication package transfers data to printers supporting the X-on/X-off feature at up to 9,600 bit/sec.

The DOC utility is available on diskette for $59 and Intersystems Communication is available on diskette with programmable read-only memory (Prom) or without for $200 and $150, respectively.

The firm can be reached at 2461 S. Main St., P.O. Box 15587, Salt Lake City, Utah 84115.

RAM Debuts

WESTLAKE VILLAGE, Calif. — A two-board microcomputer system using Digital Equipment Corp.'s LSI-11/2 CPU Model KD11-HA with power fail/auto restart, 16-bit I/O DMA port, real-time clock input, vector interrupt handling and Chrislin Industries, Inc.'s CI-1103 32K-byte by 16-bit memory board is now available form Chrislin.

The dynamic random-access memory (RAM) module has an access time of 300 nsec. On-board memory select is available in 2K increments up to 128K words.

The unit costs $1,250 from Chrislin Industries, Computer Products Division, 31352 Via Colinas No. 102, Westlake Village, Calif. 91361.

Spring Guide To Micros Ready

TEMPE, Ariz. — Publication of the spring 1979 edition of "Microshopper," a business and personal guide to microcomputers, has been announced by The Phoenix Group, Inc.

The 72-page reference and decision-making tool features 150 photographs of equipment from more than 100 manufacturers representing more than 500 products, the firm said.

Jargon Explained

The introduction to the publication offers a common-sense approach to computer jargon, and business systems and software are discussed in nontechnical terms.

The publication is available from Microage, Inc. and local computer dealers such as retail computer stores and bookstores.

"Microshopper" costs $3.95 from retail outlets or $5 direct from The Phoenix Group. More information is available from the Phoenix Group Publishing, No. 106, 1425 W. 12th Place, Tempe, Ariz. 85281.

Publisher Touts 'Games' Sequel

MORRISTOWN, N.J. — *More Computer Games*, a sequel to David Ahl's *Basic Computer Games*, has been released by Creative Computer Press.

The book contains 84 new games including "Camel" in which the players finds himself alone in the Gobi Desert with a quart of water and wild Berbers in pursuit.

"Father" allows children to argue with the computer, and the operator can test his navigational skills as a starship commander in a three-dimensional universe in "Maneuvers."

Each game is complete with description, program listing and sample run. The book costs $4.50 from Creative Computing Press, P.O. Box 789-M, Morristown, N.J. 07960.

Calif. Users Get Information Service

GRANADA HILLS, Calif. — The Southern California Computer Dealers Association has instituted a Consumer Computer Information Service; Microcomputer users from San Diego to Santa Barbara can call the service toll free.

The caller will be asked to identify his city and will be given the names, addresses and phone numbers of the three nearest computer stores. The toll free number is 800-432-7257, extension 815.

The association is at 10723 White Oak, Granada Hills, Calif. 91344.

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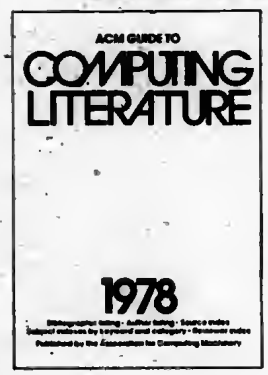

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GA Restructures Five of Its Businesses

By Marcy Rosenberg
CW Staff

ANAHEIM, Calif. — A 53% drop in profits this year and a need to tighten financial controls led General Automation, Inc. to restructure, along market lines, five strategic businesses that it will build into separate profit and loss (P&L) centers.

The first of these is GA's OEM business, which the firm elevated to divisional status under the direction of Thomas W.P. Dillman as general manager. Dillman was the firm's director of headquarters sales support; earlier, he was national sales manager for standard products and systems.

Four other divisions will be formed from the following end-user markets: financial, numeric control machine tool, industrial control and text.

In the past, GA was less market-oriented than engineering-driven, addressing OEMs and end users through a common sales organization and espousing the philosophy that "if sales were lagging, we could always develop a new widget," Dillman remarked.

Blaming this philosophy for the firm's current financial woes, Dillman said, "We're looking to become more marketing-driven. You can turn out a mediocre product, but with good marketing, it can be successful."

Forming the OEM division is an initial step toward building a group of market-specific P&L centers, each "independently measurable," to "allow us to find out where good business is coming from and where bad business is coming from," he added.

Series Targeted

Dillman's charter is to set up a markefing and technical support organization dedicated to OEM sales of the company's GA 16/100 through 500 series of micro- and minicomputers. Currently based at the headquarters facility here, the OEM division may eventually move to its own building with dedicated manufacturing as well, he noted.

The division will supply board computers, "black box" minis and systems, each available with several different compilers: Fortran IV, Pascal and Ansi Cobol Level 1, with a number of Level II extensions.

Dillman claims the product line offers OEMs a major advantage. Because all products in the 16 series family, from minis to micros, are "software- and peripheral-compatible," an OEM can go after the low-end through high-end of the market with a minimal investment in software and hardware.

In addition to targeting products to the systems house OEM, GA's new division plans to sell to distributors and retail outlets such as J.C. Penney Co., Inc., Sears Roebuck and Co. and Tandy Corp., he noted.

GA's OEM business currently represents 35% of sales, which, for the year ended July 28, totaled $116.374 million, an 18% increase from $98.380 million in 1978. Dillman's five-year plan is to build OEM sales into a $100 million business for the company.

Unlike other minicomputer manufacturers

(Continued on Page 68)

IBM Seen Shifting Priorities To Small Business Systems

SAN JOSE, Calif. — IBM will shift its corporate priorities to the small business computer field, where it is expected to dominate throughout the 1980s, according to a report by Creative Strategies International (CSI), a market research and consulting firm.

IBM, which accumulated more DP dollars — $14.7 billion — in 1977 than the combined total of the next 45 top U.S. DP firms, will make the shift to small computers and office automation because of the high growth potential of the field, the report said.

As an industry leader, and in order to support its heavy operations base, IBM is pressured to grow at or above its historical record, CSI noted. To achieve such a growth rate, IBM has traditionally set out to create or capture fast growing markets at an early date.

This means IBM must anticipate and recognize a market's growth potential as many as 10 to 20 years in advance, and product development efforts must be inaugurated seven to 10 years before market entry, CSI said. IBM spends approximately 1% of its annual revenues for marketing intelligence activities and about 8% of its annual revenues on technical research and development.

CSI reported that except for NCR Corp. and Univac, IBM has more years of experience in small computers than any other vendor. CSI also stated that IBM has dominated the larger business computer market since the mid-1960s. This experience, coupled with IBM's current lead in technological innovation, led CSI to predict that IBM will penetrate and dominate the small computer business market in the 1980s.

The type of computer IBM will focus on is a business applications-oriented system with an entry-level purchasing price of less than $100,000. At least 65% of the processing time must be dedicated to solving business problems using typical business applications.

Looking at the 1980s, CSI predicted the rate of technological and marketing change will be at least twice that of the 1970s and the level of competitive activity will be three to four times greater than it was in the early seventies.

Achieving Dominance

In order to acquire dominance in the market, CSI stated IBM will have to acquire technical and marketing leadership and migrate a very large base of installed small business and data entry equipment users.

Achieving market dominance will not be an easy task even for IBM, CSI noted. The company's success will depend upon its ability to implement an overall plan, taking into account any and all major problems, shortcomings and industry variances.

According to the report, the strategy for small business systems dominance will be three-pronged and will include market lead-

(Continued on Page 66)

CDC Sales Up 30% In Peripherals

By Connie Winkler
CW Staff

NEW YORK — Control Data Corp.'s OEM sales of peripherals, up 30% in the first half of 1979, are leading the firm's computer business.

Sales of peripherals, particularly disk memory products, have accelerated because of the explosive growth in minicomputers, CDC Chairman William C. Norris told a recent meeting here of the New York Society of Security Analysts. "Our main concern at present is to meet a burgeoning market without overexpanding manufacturing facilities," he said.

Peripherals revenues are growing because of efficiencies gained through joint ventures in peripheral equipment development and manufacture with several companies including NCR Corp., Honeywell, Inc. and ICL, Inc., Norris said.

CDC expects its computer business to grow until it accounts for 75% of the company's revenues by 1984. In addition, the firm intends to continue to expand the systems lease business.

Lease revenues from systems in 1979 will

(Continued on Page 66)

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Report Says IBM to Target Small System Users

(Continued from Page 65)

ership, account control and the maximizing of account expenditures. A key factor in market control will be an understanding of the market and IBM's ability to stay at the forefront of technological innovation, CSI noted.

In 1972, IBM began to look at the 1980 marketplace. The System/38, known internally as F1, was IBM's first step, with F0 and F2 still to be developed and introduced, CSI noted. The General Systems Division (GSD) will soon announce projects such as ELS, a low-end 5100 product, and Triple Play, a multiterminal ELS at the low end of the small system scale.

The 5250 BWC is also predicted to be less than two years away from market entry. Other products may also be introduced by CSD through its soon-to-be-announced retail store and service bureau outlet.

The new products will be carefully positioned by IBM, and the report said at least one small business system alternative will be provided for every price/performance and price/function area. In accomplishing this, IBM will follow multiple growth paths, implement incremental growth path packaging and pit one IBM division against another.

Reversing Slippage

Account control, which slipped at IBM in the seventies, will become the target of a major reversal effort, and IBM's Reliability, Availability and Service (RAS) capability will be extended, the report indicated. Project Q, a refinement of RAS, will allow the sales force to enhance the single-vendor, total-solution concept.

In additon to the single vendor, the 1980 concept of account control will emphasize new programming languages, longer installations and multiple growth paths for users, CSI said.

New development tools and the unfolding of a new level of small business system functionality will result in an increase in the end-user applications growth rate and thereby enlarge expenditures, CSI predicted. After the discussions with user groups held over the last few years, the company also plans to work to alleviate many user complaints.

Although IBM's dominance in the small business systems market will not be immediate, it is looked upon as inevitable, according to the report. The firm's large economy of scale, experience curve and the desire for dominance will make it possible. Other vendors should be aware of this; by keeping everything in perspective, they can become successful in the market, CSI noted.

The report, entitled "IBM's Long Range Strategy for Small Business Computers," costs $995 from CSI at Suite 275, 4340 Stevens Creek Blvd., San Jose, Calif. 95129.

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Peripherals Lead Sales at CDC

(Continued from Page 65)

represent a 20% increase over 1978, according to Marvin G. Rogers, senior vice-president of finance.

Today the computer business accounts for only 70% of CDC's revenues. "We now have a much better balance in the computer business than we did five years ago. All of the major areas of the business — services, systems and peripherals products — are solidly in the black," Rogers said.

"Althoogh some subsegments such as OEM can be relatively sensitive to economic conditions, others such as data services are much less so."

Revenues from the computer business for the first half of 1979 are $1.028 billion vs. $850 million last year. Year to date sales from CDC's Commercial Credit finance and insurance segment were $461 million, compared with $420 million in 1978. Combined computer and financial revenues this year totaled $1.489 billion, compared with $1.270 billion in 1978.

In 1976 CDC estimated that by 1981 combined computer and finance revenues would be $3 billion and computer service revenues, $1 billion, Rogers said. Now the company expects to reach that $3 billion mark in 1979 and that computer services will reach $1 billion in 1980, a year ahead of projections.

One market area that CDC will more intensely address is computer-based education through its Plato network system, Norris said, admitting Plato has not been a big money-maker.

To expand the market, CDC has started to move Plato into homes on a pilot basis for $100 a month. The hurdles here are cost and lack of adequate courseware, but the chairman believes these problems will be overcome.

He also cited the company's development work in laser optical digital and disk recording that could increase storage capacity for digital data and video disk presentations and be particularly important in computer-based education.

In addition, the company plans to beef up its marketing of computer-based education systems to the financial community. Norris restated CDC's commitment to what it calls the "Cincinnati Stock Exchange" system, designed as an alternative to the New York Stock Exchange approach.

"Although only limited courseware is now available, we see great potential in providing an investor a means to access the information he wants when he wants it," Norris said.

Coast Show Draws 50,664; Bubble Memories Debut

By Jeffry Beeler
CW West Coast Bureau

SAN FRANCISCO — If attendance at the recent Wescon/79 conference is any indication, the near-term future of the computer and electronics field looks brighter than ever.

Wescon/79's huge draw of 50,664 attendees easily eclipsed last year's turnout of 35,327 visitors and suggested that the intense worldwide interest in high technology will almost certainly continue to grow during coming years.

As in past Wescon shows, this year's edition was heavily slanted toward component manufacturers and gave only limited play to the major systems vendors. Despite the absence of IBM and other big-name mainframes, however, Wescon/79 gave users plenty to ponder since many of the OEM components displayed at the conference will someday find their way into end-user products, if they have not done so already.

Among the component-level products introduced last week at the show were three magnetic bubble memory systems from Plessey Microsystems, Inc. One of the systems, a Multibus-compatible unit named the PBM 80S, operates at 100K byte/sec and permits a 512K-bit card to be configured with 64K-bit devices.

The PBM 80M, by contrast, expands to as much as 2M bytes and accesses data at an average speed of 2 msec, according to a Plessey source. The third system, the PBM 90M, is geared for military and other severe environment applications.

The three models cost $2,997, $6,600 and $1,100.

Like Plessey, Texas Instruments, Inc. introduced bubble memory systems at the show. Together, the TI systems form a bubble memory family that consists in part of the TBB5005, a

CW at Wescon/79

512K-bit device packaged on a 4-by 6-in. board, and the TBB 5010, a 1M-bit device that also fits on a 4- by 6-in. card.

Available in the fourth quarter of this year, the TBB5005 and TBB5010 will cost $2,100 and $3,100, respectively.

DG Plans N.C. Plant

WAKE COUNTY, N.C. — In efforts to bolster its Sun Belt operations, Data General Corp. recently announced plans to build a final assembly, testing and shipping plant on 125 acres here.

The 300,000 sq-ft plant, expected to cost between $8 million and $10 million, is slated to be operative next summer.

The announcement came on the heels of a recent decision to expand DG's Raleigh research center by 280,000 sq ft. Company officials admitted the North Carolina expansion reflects DG President Edson D. deCastro's dissatisfaction with DG's base state, Massachusetts.

DeCastro, a long-time critic of what he calls excessively high state taxes, said DG can't attract DPers to its Westboro headquarters, an area some call the computing capital of the world.

Need a Teleprinter Fast?
See Page 17

PE Loses Patent Suit

SAN FRANCISCO — Perkin-Elmer Corp. (PE) has lost at least the first round of its patent infringement suit against Computervision Corp., a Bedford, Mass.-based manufacturer of computer-aided design and semiconductor production equipment.

A federal district court jury here acquitted Computervision's Cobilt Division of allegations that it applied proprietary PE technology in the design of its CA 3000 semiconductor projection alignment system.

Filed in November 1977, the suit had accused the Santa Clara-based division of infringing on two patents, both protecting the optics system of PE's Micralign projection mask aligner, which competes with Computervision's CA 3000. In its decision, the jury concluded that Cobilt's optics system design was sufficiently different from its PE counterpart to warrant rejection of the plaintiff's case.

Commenting on the decision, a PE spokesman said, "Naturally we were disappointed with the finding of noninfringement by Computervision's Cobilt Division and are considering further legal action in support of our position." He declined to be more specific.

Cobilt's CA 3000, the subject of contention in the trial, is said to aid integrated circuit production by aligning masks with wafers and the design patterns embedded on them.

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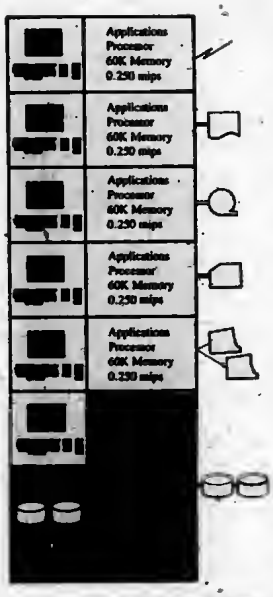

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ARCPAC is designed to make it easy for you to get into attached processing. The package comes in two versions: with 20MB of disk storage or, for a little higher price, 120MB. Both packages include five 60K applications processors and one 120K file processor, plus all connecting cables, system software, and languages, at the low package prices.

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Phaseout of Silicon in IC Technology Predicted

By Molly Upton
Special to CW

SAN FRANCISCO — Future high-speed integrated circuits (IC) are likely to be made of gallium arsenide (GaAs) rather than silicon because GaAs offers great improvements in speed without sacrificing miniaturization.

That prediction was made by two different speakers at a Wescon/79 session on picosecond electronics here recently.

Paul T. Greiling of Hughes Research Laboratory in Malibu, Calif., said GaAs IC technology "offers a two to six times speed improvement with the same critical electrode dimensions and a simpler process than [its] silicon counterpart."

GaAs has demonstrated gigabit data rate logic, which is beyond the reach of current silicon ICs. In addition, GaAs has high electron mobility, high saturated drift velocity, a low threshold field and semi-insulating substrates.

CW at Wescon/79

Robert W. Keyes of IBM's T.J. Watson Research Center observed that although there is a great body of knowledge concerning the use of silicon in developing Mosfets, almost all the physical properties of GaAs are more favorable to these devices than are those of silicon.

Fabrication of GaAs ICs involves only six steps, a reduction of 30% to 50% over silicon technology in the number of masking steps, Greiling pointed out.

But there are disadvantages to using GaAs. These include "immaturity of the technology and, therefore, the lack of control of the material and processing parameters and the lack of a native oxide for masking, isolation and passivation," he said.

There are three different logic-gate configurations presently being used for high-speed GaAs ICs. The depletion mode field effect transistor (DFET) is the fastest circuit, but also dissipates the most power.

The Schottky-diode field effect transistor logic (SDFL) dissipates less power and is slower than DFET. SDFL uses depletion-mode GaAs field effect transistors for most of the circuitry, but has small Schottky-barrier diodes for logic decision functions.

The third approach is to use logic gates with enhancement mode field effect transistors. These have the lowest power consumption, with speeds slighly slower than the depletion mode. However, yields are too low now and it is more vulnerable to noise than DFET.

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GA Revamping Five Businesses

(Continued from Page 65)

that are expanding from OEM into end-user markets, GA hopes to improve its cash flow by investing "several million dollars" to beef up its OEM business — a market that usually yields more high-volume purchases and often requires less maintenance and support than the end-user market.

Where does this leave GA's end-user business? "Developing products and systems for sophisticated end users has always been the lifeblood of this company, and while this may not always have been the most profitable part of the business, we're not going to abandon it," Dillmao said, citing the four end-user divisions in the offing.

Indeed, profits have been sliding. Net income for the year dropped approximately 53% to $2.892 million or $1.11 a share from $6.173 million or $2.43 a share in 1978. Earnings from 1979 include extraordinary credits of $1.734 million or 66 cents a share, compared with extraordinary credits of $2.208 million or 87 cents a share the previous year.

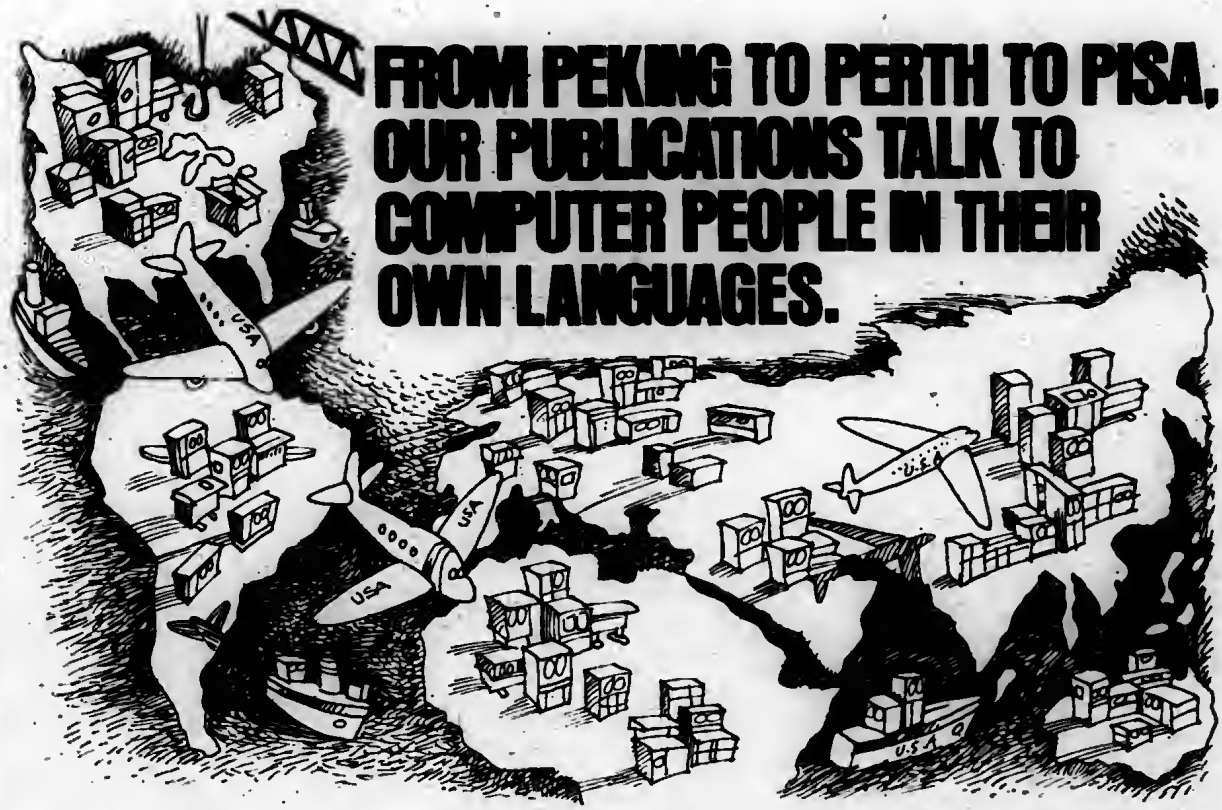
Fourth quarter earnings took a 51% dip to $945,000 or 36 cents a share from $1.937 million or 74 cents a share for the similar period a year ago. Sales for the quarter rose slightly to $31.660 million from $31.163 million for the 1978 quarter.

Current quarter net income includes about a $1 million gain on the sale of GA's holdings in Honeywell, Inc. and $85,000 in income tax benefits resulting from operating loss carryforwards. Similar tax benefits in 1978 resulted in extraordinary credits of $231,000 or 9 cents a share.

Operations for the quarter resulted in a loss of $149,000 or 6 cents a share before extraordinary credits, compared with income of $1.706 million or 65 cents a share for the same period last year. Operating income began to slip earlier this year when GA laid off more than 100 employees to cut about $2 million in expenses [CW, March 12].

Frank A. Grisanti, GA president and chief executive, attributed lower than expected operating results to a delay in shipments caused by shortages of Schottky low-power supply components and printed circuit boards. He expects these shortages to continue through the first half of fiscal 1980.

According to Dillman, one reason for the parts shortages is that "a lot of our component suppliers are shipping products to Europe because they make more money over there." He admitted deliveries at GA have stretched out to 120 days from the 60-day deliveries quoted about two years ago.



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As an MIS professional deeply involved in the development and implementation of a new business information system, you would work closely with engineering, operations, accounting, marketing, and other administrative support activities.

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Marketing Systems – You're ready to move ahead, using your 2-5 years marketing or manufacturing systems experience (project leadership background a plus). You'll have opportunities to develop and implement on-line order entry, marketing support and sales forecasting systems. Other responsibilities include analysis of present order entry functions as well as design of new on-line data base order entry systems.

Finance/Administrative Systems – Systems development and implementation will include, standard cost, cost accounting, general ledger, accounts payable and payroll. An advanced technology system will also be developed for Personnel and other administrative support activities.

PROGRAMMING/DESIGN

Lead Programmers/Analysts – You're ready! – for total systems implementation responsibility – and we'll give it to you! You have up to six years career experience, 3 years as a COBOL programmer in an IBM 370 environment, ideally as an on-line development programmer and three years as a program system designer and project leader. You should be thoroughly knowledgeable in structured design and programming techniques. IMS experience a definite plus.

Programmer Analysts – Here, you would be designing and implementing major manufacturing, marketing and financial subsystems. Your experience? – 2-5 years as a COBOL programmer in an IBM 370 environment, ideally in on-line development. You're familiar with structured programming techniques, indexed and direct access methods, JCL and utilities.

PROCEDURES

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These are exciting "NEW SYSTEMS DEVELOPMENT" positions in data processing. Allen-Bradley people report you can feel the enthusiasm and anticipation of new challenges that match the Systems Group's amazing growth. Match your professional expertise with our needs. You'll be glad you did. Excellent total compensation plan, with generous benefits, of course. Act NOW! Send your resume and current salary history/requirements to:

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SYSTEMS GROUP

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Amy Nielsen
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of Chicago
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Washington, DC 20014
(301) 653-1600

KANSAS CITY

MIS DIRECTOR

Two hundred million dollar midwestern manufacturer seeks proven turn around manager. Company faces major hardware upgrade to a four MEG 3031 in the near future. Upgrade will require complete revision and expansion of all manufacturing and accounting systems. Proven track record of developing on-line manufacturing systems is required. Job reports to the Vice President of Finance. Salary to $45,000.

D P MANAGER

Small town midwestern manufacturing firm with two MEG 370/136 shop requires proven management ability to take over this totally on-line shop. Excellent opportunity for a systems III manager to move up. Company will be installing new manufacturing data base this year. Salary to $28,000 plus management incentive program.

EDP AUDIT

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SYSTEMS PROGRAMMER

Kansas City state-of-the-art financial installation needs a lead software programmer. Shop requires two years OS internals with six months experience in generation, maintenance, and tuning of MVS. Opportunity exists to work with large TP network with both local and remote terminals under IMS DB/DC. Salary to $27,000.

SYSTEMS ANALYST

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SENIOR PROGRAMMER/ANALYST

National distribution company with corporate data center in the midwest requires a Senior programmer/analyst willing to travel 25% of the time. The person will be responsible for the development of new systems at corporate data center and the installation of the same at regional sites throughout the United States. Person must possess solid structured COBOL techniques. Strong communications skills and the willingness to work in either an OS or DOS/VS environment is required. Position provides high visibility throughout both corporate and divisional levels. Salary to $25,000.

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PROGRAMMER/ANALYST
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BSEE 6 yrs + sftwr engr exp in flight simulation. Stress optimization of Fortran programs. Assy and/or Fortran lang bkgd. Univac, Interdata, IBM 360-370 environment. Design, code checkout and implement systems sftwre. TSO and file manipulation. Interdata 8/32 arch. ..... $24,000.

SR SYSTEMS ENGR

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PALO ALTO NORTHERN CALIFORNIA

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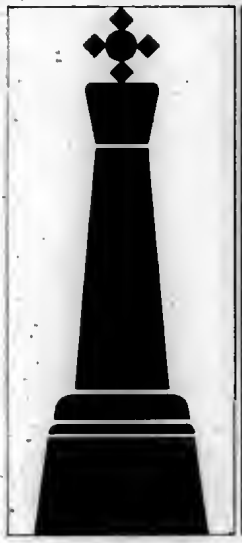

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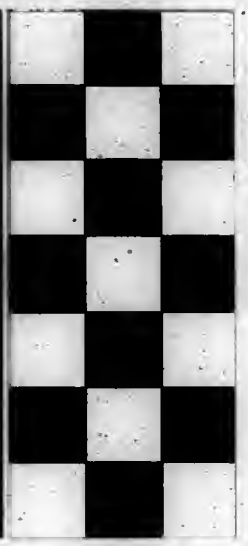

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Commencing salary, according to qualifications and experience, will be in one of the ranges, Lecturer $A16291 - $A21401, or Senior Lecturer $A21858 - $A25477 per annum. Fares to Australia (appointee and dependants) and a relocation allowance are paid.

Applications, containing full details of qualifications, employment history, research interests, publications list, and the names and addresses of three referees, should be posted to the Bursar, **The University of Wollongong**, Box 1144, P.O., Wollongong, N.S.W. 2500, Australia. **Please mark envelope 'Confidential - Appointment.' Closing date, 1st November, 1979.**

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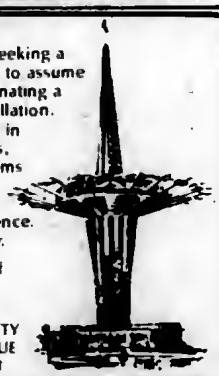

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RESOURCE MANAGER
Provide forecasting data for the Data Processing planning division. Analyze equipment alternatives, software alternatives and applications designs with respect to resource capacity. Leads and participates in projects involving performance management, Data Center Support, Technical Services and Research & Standards. Minimum 2-4 years experience in similar capacity required.

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Senior Programmer responsibilities include user interface coordinator analysis, program and system design and maintenance. Minimum of 4 years of programming experience required with a strong IBM BAL background.

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The Weeg Computing Center provides computing services for the University's academic community. The Center operates an IBM 370/168 under VM/CMS, four Prime 750s linked via Primenet, several Hewlett-Packard 2000 systems, and a Control Data Cyber 70/71. We have openings for the following positions in this dynamic, stimulating environment:

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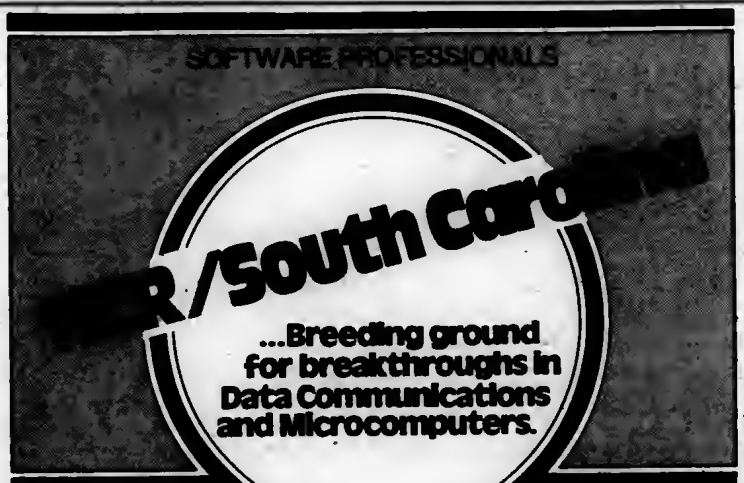
We have hundreds of positions listed to help you reach your objectives . . . a new challenge; relocation, more money; new experience; change industry; increased responsibility; job security, growth potential.

Send us your resume, we will review it and call you. Our service is CONFIDENTIAL, is NATIONWIDE, and without cost to you; companies pay all fees.

Mark Potter
CADILLAC ASSOCIATES, INC.
33W. Randolph Street
Chicago, IL 60601
(312) 346-9400



Something important is going on in Columbia, South Carolina. All the professional excitement you could ask for is part of the picture. We're pushing beyond the current state-of-the-art in two of the most exciting technologies of today—data communications and microprocessors.

We're developing software for operating systems, front-end processors, communication drivers, I/O device handlers and diagnostics. If you're a software professional who has helped solve the systems software problems involved in the development of minicomputers, microcomputers, and mainframes, then we invite you to get into the action. Start by exploring these key openings in our software departments:

MICROPROCESSOR SOFTWARE DEVELOPMENT

This department is engaged in the development of software for on-line interactive data processing systems. Software product areas currently under development or planned for the near future include both development of support systems and real-time operating systems. We seek people with design implementation and support of compilers, assemblers, link editors, object processors, automated software distribution and control libraries. Openings also exist for individuals with design implementation of real-time communications-oriented multi-tasking operating software for microcomputers or equivalent.

ADVANCED SYSTEMS DEVELOPMENT

This area provides early definition and design of future microcomputers in communications products along with initiation, early program management, and startup development of new programs. This group offers opportunities for individual contributions in a systems level scope of design from the conceptual stage to finished product. We require senior analysts with a minimum of 5 years in software plus knowledge of hardware in any one of the following areas: • Microcomputer Design • Communications Product Design • Communications Network Architecture • Systems Modeling Performance Measurement and Analysis.

MICROPROCESSOR SYSTEMS DEVELOPMENT

This department is primarily responsible for designing, implementing general purpose microcomputer systems. Key decisions are made here regarding processor design, memory design, and overall systems architecture. We seek software professionals to help make the decisions for our next generation microcomputer systems. These people must have extensive experience in both systems and applications software. Other opportunities exist for personnel with experience in the following areas: • Diagnostic Systems • Diagnostic Programs • Startup Firmware • I/O Handlers • Microcode.

COMMUNICATIONS SYSTEMS DEVELOPMENT

This group is charged with the responsibility of proposing, designing, and providing hardware and software modules for future communications products. Concentrating both hardware and software development in one group of professionals allows the application of top-down system design techniques developed only recently within the industry. Current challenges include the successful application of small, inexpensive microprocessors in communications systems, such as controllers and front ends in place of minicomputers often used today. Opportunities exist for personnel with experience in any of the following: • Design and Development of Communications Protocol Drivers • SDLC • Communications Diagnostics • Intelligent Communications Controller General Software.

COMMUNICATIONS SOFTWARE

Get in on the ground floor of advanced communication design and participate in NCR's entry to Distributive Network Architecture, consisting of a series of microprocessor-based terminals and nodes connected by communications lines. We seek individuals who have in-depth software background with solid communications experience. Qualified applicants must provide definition, design and implementation leadership in any one of the following areas: • Microprocessor Software • Communications Links Disciplines (SDLC, Bisynch, ISO, etc.) • Front End Processor Software • Network Node Software • Network Definition Language (System Generators) • Constructors for Nodes, Cluster Controllers and Front Ends • VTAM NCP (for interface to SNA Network).

NCR—Columbia not only offers you a state-of-the-art technical environment, but also a lifestyle which will offer you the best of both worlds. Columbia, which is close to the seashore and mountains, enjoys the lifestyle of both city and country living with fine recreational facilities for tennis, golf, fishing, camping and water sports. The area also has excellent housing opportunities, low taxes, and is the home of the University of South Carolina.

For immediate consideration, please send resume and salary history to: Mr. Ken Uhlig, Engineering and Manufacturing, Dept. S50, NCR Corporation, 3325 Platt Springs Road, West Columbia, S.C. 29169. Or, call him collect at (803) 796-8250

NCR
Complete Computer Systems

An Equal Opportunity Employer, M/F

MIS DESIGNERS

MANAGEMENT RECRUITERS has been chosen to conduct an exclusive NATIONWIDE search for the purpose of selecting five (5) very special professionals. These individuals will be responsible for the CONCEPTUAL FORMULATION and DESIGN of an extensive MANAGEMENT INFORMATION SYSTEM for a major Insurance Company. Additionally, significant management responsibility will exist with staff sizes ranging from 20 to 50 professional Programmers and Analysts working in a large, state-of-the-art, IBM environment.

If you have several years experience in PROJECT DESIGN and management of large scale FINANCIAL SYSTEMS, the communication skills to deal with management up to the Executive level, and experience in the Property and Casualty side of the insurance industry, you may be the very special person for these very special positions. Salaries range from $30,000 to $45,000.

If you would like to explore this unique opportunity, phone or write JOEL POLIN:
One Oxford Valley, Suite 400, Langhorne, Pa. 19047
215/757/1543

MANAGEMENT RECRUITERS®
OF BUCKS COUNTY

HOUSTON PROGRAMMER/ ANALYST

KIRBY BUILDING SYSTEMS, INC., a rapidly growing international marketer of pre-engineered metal buildings has immediate opportunities for Programmer/Analysts. Our DP Center has PDP 11/70s and 11/34s using RSTS and RSX with plans for a distributive system.

BUSINESS SYSTEMS P/A
Participate in a major project to up-grade our business information systems to the latest on-line integrated applications. Experience with Basic-Plus, COBOL and RSTS. Requirements definition and package software conversion/implementation experience a plus.

ENGINEERING SYSTEMS P/A
Be a key figure in the development of an on-line computer based engineering system for metal buildings design.

Experience with FORTRAN and RSX as a Civil Structural Engineer or a metal building company a must. Interactive graphics, AUTO/STEEL. Computer Engineering Design/Drafting experience a plus.

We offer excellent salaries with exceptional benefits package. Resumes may be mailed to:

Frank Smith
Director of Data Processing **(713) 666-1941**

KIRBY BUILDING SYSTEMS, INC.
P.O. Box 36429 **Houston, Texas 77036**

Kirby BUILDING SYSTEMS

We Are An Equal Opportunity Employer M/F

DATA PROCESSING PROFESSIONALS

Are You Seeking Greater Challenge and Responsibility?

Northern Electric Company, Division of Sunbeam Corporation, has immediate openings for experienced Information Systems specialists.

THE COMPANY

Corporate headquarters located in Laurel, Mississippi, with primary manufacturing facilities in the Southeast and Southwest. Growth oriented and aggressive staff with medium-sized EDP shop. IBM 370/138 hardware and wide range of on-line manufacturing, financial, and marketing applications using COBOL. Company provides liberal benefits package, including outstanding Profit Sharing plan, and competitive salary levels.

THE REQUIREMENTS

PROGRAMMER/ANALYSTS:
3-5 years experience in development of manufacturing or marketing applications, B.S. degree preferred, knowledge of CICS command level coding and O/L1 data base techniques helpful.

SYSTEMS ANALYSTS:
3-5 years experience in development of on-line systems, operating procedures for users and interface between EDP staff and user departments. Thorough understanding of computer systems development in manufacturing-inventory control areas is essential.

If you possess these qualifications and are interested in joining a rapidly growing, progressive organization please forward your complete work and salary history in confidence to

NORTHERN ELECTRIC COMPANY
P.O. Box 247
Laurel, MS 39440
Attn: Personnel Representative

An Equal Opportunity Employer M/F

EDP AUDITORS TO: $26,000

Our client, an expanding subsidiary of Fortune 50 giant has immediate opportunity for several EDP Audit professionals. Client seeks degreed persons with 1+ yrs. EDP Audit exp. or OS/MVS Systems & Programming exp. with desire to enter EDP Audit field. Desirable Midwestern location. Excellent advancement, full career benefits. **Call Jim Schwab at 704/375-0600 or send resume in complete confidence to:**

FOX-MORRIS
Personnel Consultants
1742 Southern National Center
Charlotte, N.C. 28202
EDP SPECIALISTS

COMPUTER PROFESSIONALS

Challenging positions exist in the Northwest and nationally. Whether your career goal requires relocation or a new position in your present area, Dunhill of Edmonds can assist you. We offer confidential, professional, personal service in all areas of Data Processing placement.

Contact: Jana Jones

Dunhill
OF EDMONDS, INC.
100 2nd Avenue Suite 360
Edmonds, Washington 98020
206-775-5673

SYSTEM PROGRAMMERS

Boise State University is seeking a qualified Software Specialist Senior to provide technical support for its DOS/VS, POWER/VS, DL/I, CICS, RJE installation. The successful applicant will not only be responsible for the operating system, but will also serve as a resource person for other Computer Center employees. Should no qualified person be found, consideration will be given at the Software Specialist (Junior) level. BSU is located in the major metropolitan area of the State, which offers a variety of cultural and outdoor activities. Write or call for application to be returned by Nov. 2, 1979. Starting date approximately December 1, 1979.

BOISE STATE UNIVERSITY
Center for Data Processing
1910 University Drive
Boise, ID 83725
(208) 385-1159

Boise State University is an EEO employer/educator

Data Processing

a subsidiary of

SYSTEMS/ PROGRAMMER ANALYST IT'S SOUTHERN CALIFORNIA

For an exciting career opportunity and the best of carefree, sunny living close to the fun things in life.

Williams Brothers Engineering Company, a dynamic and growing firm, is the operator of the Elk Hills Naval Petroleum Reserve near Bakersfield, California. Just two hours from Los Angeles, the Bakersfield area combines the convenience of a large city with the pleasures of close-at-hand recreation areas.

This is a new position which requires a minimum of three to five years experience in designing, developing, implementing and maintaining business applications (i.e. Payroll, Accounts Payable etc.) in an IBM 370 environment.

Your working environment will be utilizing the following hardware/software: An IBM 4331 computer DOS/VSE, CICS/VS, DLI and VSE/Power. Overall responsibilities include a wide range of systems development activities and the continuing support of business applications at NPR #1.

This position offers a competitive salary, supplemented by a comprehensive benefit program including pension and investment plans, credit union and excellent group medical insurance.

Add your energy to help support one of the largest oilfields in the United States, by rushing your resume to:

Personnel Services

WILLIAMS BROTHERS ENGINEERING COMPANY

P.O. Box 86
Tupman, CA 93276

An Equal Opportunity Employer
Minority/Female/Handicapped are encouraged to apply

SYSTEMS DEVELOPMENT EXECUTIVE

Expanding growth has created an outstanding new executive opportunity in the Management Services Department of a major midwest transportation-resource company.

Responsibilities include short and long range planning, coordination of interface with user departments, major input in departmental decision making and total applications development in a large, modern and creative shop. Hardware includes numerous large scale IBM computers operating multiple telecommunications systems.

Candidates should have an appropriate education, together with ten to fifteen years of Data Processing experience. Good interpersonal skills and decision making abilities essential.

Qualified applicants should send resume and salary history in confidence to: **CW Box 2073, 797 Washington St., Newton, MA 02160**

an equal opportunity employer

EDP MANAGEMENT CONSULTANT

A progressive international "Big 8" CPA firm in Tampa, Florida is seeking an individual with at least three to five years of responsible data processing experience. This EDP management consulting opportunity requires the candidate to have experience in systems design, system selection and evaluation, minicomputers, programming, and an indepth understanding of general computer applications. Specific experience with IBM DOS and CICS is helpful. Excellent problem solving ability, and written and verbal communications skills are required. Qualified individuals should possess a B.S. degree at a minimum.

This position offers an extremely rewarding professional challenge and a superb geographic location in Florida. If you are seeking a responsible position with a dynamic management consulting practice, please send your qualifications, including salary history, to us in confidence.

ARTHUR YOUNG & COMPANY
Management Services
P.O. Box 380
Tampa, Florida 33601

An Equal Opportunity Employer M/F

ARTHUR YOUNG

State-of-the-Art SOFTWARE DEVELOPMENT

San Francisco Bay Area

SRI International is involved in the development of complex state-of-the-art software to support a large signal processing project. Our many current openings, each of which has considerable career growth potential, include:

LEAD PROGRAMMER/ SR. SCIENTIFIC PROGRAMMER/ANALYST

An exceptional opportunity to lead the programming effort on large, complex, innovative, scientific programming projects. Will interface with clients and SRI staff to determine program functional and performance requirements. Will be responsible for top-level program design. Will direct others and participate in all phases of program development: detailed design, specifications, coding, documentation, debugging, and verification. Knowledge of FORTRAN required, PASCAL desirable. Familiarity with CDC computers useful but not mandatory. M.S., Ph.D/ Software Engineering, Computer Science, or equivalent experience.

PROGRAMMER/ANALYST

Opportunity to work as a key member of a top-notch design and implementation team for large, complex software projects. Will do program design, specification, coding, documentation, debugging, and verification. Responsible for assessing computer hardware/software usage tradeoffs, and maximizing efficient system utilization. Knowledge of high level languages (PASCAL, FORTRAN) required, familiarity with assembly language desirable. B.S. or M.S. in Computer Science or Software Engineering.

SCIENTIFIC PROGRAMMER/ANALYST

In this position you will work as part of a team to solve engineering and signal-processing problems with the aid of a computer. Responsible for analysis of engineering problems, design, specification, coding, documentation, and debugging of computer programs, and interpretation of computer results. FORTRAN experience with CDC machines useful. B.S., M.S., Ph.D/EE, Physics, Math, or Computer Science.

SCIENTIFIC PROGRAMMER

You will work with engineers to develop program for engineering applications, and work with other programmers to develop utility routines for file management and mathematical calculations. You will be responsible for all phases of program implementation and checkout. Knowledge of FORTRAN necessary. Familiarity with CDC machines a plus.

RESEARCH ENGINEER

Research, analysis, oral and written presentation in the area of digital signal processing.

SRI INTERNATIONAL (formerly Stanford Research Institute) is a problem solving organization performing basic and applied research under contract for clients in business, industry and government on a worldwide basis. We offer a stimulating environment, excellent company benefits including liberal vacation and company paid retirement.

Please send resume to, or phone Beth Solomon, (415) 326-6200, ext. 2949, SRI INTERNATIONAL, 333 Ravenswood Ave., Menlo Park, CA 94025. We are an equal opportunity employer. U.S. Citizenship required.

SRI International

If you're not the first to read this issue, you may be the last to know.

To subscribe, you can use your American Express, Visa or Mastercharge card and call, toll free, 800-225-3080 (in Massachusetts, call 617-965-5800).

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

SYSTEMS PROGRAMMER

We are a recognized worldwide leader in the manufacture of baby products. Our newly constructed, modern facility is located in the Somerset County of Central N.J.—equidistant between New York City and Philadelphia. *The atmosphere is healthy!*

Degree and/or equivalent experience. 3-5 years experience working with DOS/VS, POWER/VS, CICS/VS. Environment includes 3031, Data Base, VM and CMS.

This rapidly growing company offers career potential with excellent salary and benefits. For immediate consideration, call or send resume, including salary requirements, in complete confidence to Ms. M. Weaver.

Johnson & Johnson
BABY PRODUCTS COMPANY
Grandview Road, Skillman, N.J. 08558
201-874-2194

Equal opportunity employer M/F, Vietnam-era veteran

FACULTY POSITION
INFORMATION SYSTEMS AREA
University of Cincinnati

Two tenure track positions, rank open. Research, teaching, undergraduate and graduate program development. Ph.D required. business experience desirable. Interests could include information systems design & administration, data base management, secure system control, natural language access, software methodology, business applications. Competitive salary; local consulting opportunities. Send resumes to:

Lawrence J. Mazlack
Information Systems
Department of Quantitative Analysis
University of Cincinnati
Cincinnati, OH 45221
(513) 475-5821

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frank leonard

FLORIDA
DATA COMMUNICATIONS TECHNICIAN

LEADING DATA PROCESSING COMMUNICATION and PERIPHERAL MANUFACTURER located in the SUNSHINE STATE is looking for TALENTED DATA COMMUNICATIONS TECHNICIANS. Experience with NETWORK TROUBLESHOOTING, TELEPHONE COMPANY INTERFACING, MODEMS, E.I.A. SPECIFICATIONS and SOFTWARE LINE PROTOCOLS is DESIREABLE. SALARY to LOW TWENTYS. Please submit RESUME including SALARY HISTORY or CALL:

FRANK LEONARD PERSONNEL
Suite 100
1211 North Westshore Boulevard
Tampa, FL 33607
813-872-1883

Reynolds Electrical & Engineering Co., Inc. has immediate job opportunities available in Las Vegas, Nevada.

PROGRAMMER

Opportunities exist for individuals with experience on large-scale computers in a timesharing environment. We are looking for talented individuals with at least two years of applicable computer programming experience plus a degree in business administration, mathematics, accounting or computer sciences.

Must be a U.S. citizen.
Replies held confidential.
Liberal fringe benefits.

EQUAL OPPORTUNITY EMPLOYER — M/F

Send resumes to:

Ms. Trudie L. Rainey, M/S 567
Post Office Box 14400
Las Vegas, NV 89114
Tel: 702-734-3291

REECo **Reynolds Electrical & Engineering Co., Inc.**

data processing

BUSINESS SYSTEMS ANALYST

A Chicago area Medical Center is currently seeking a Business Systems Analyst to join its Systems and Procedurs Department.

The qualified candidate will have a Bachelor's degree in a technically-related field or equivalent experience, and 4-5 years successful experience including manual systems specialities, overall systems flow and financial applications or systems.

Responsibilities of this dual-function (generalist/technician) key position will include comprehensive user interface, the analysis, specification, design, development and documentation of non-computer aspects, input/output of systems, and integrated systems effectiveness and efficiency.

We offer a salary commensurate with experience and ability, a comprehensive package of fringe benefits that include 3 weeks paid vacation and an atmosphere conductive to personal and professional growth. For consideration, please submit your resume, including salary history and requirements, to:

CW Box 2077
797 Washington St.
Newton, MA 02160

An Equal Opportunity Employer M/F

SOFTWARE DEVELOPMENT
CORPORATE OFFICE OPENINGS

United Computing Systems, Inc., an established and growing international computer services firm in Kansas City, has senior and junior level openings in:

COMMUNICATIONS SOFTWARE & DEVELOPMENT: Qualified individuals are needed to participate in the growth of UCS's international telecommunications network — UNINET. This growing network serves multiple data centers from over 150 cities within the U.S. and Europe. Responsibilities include design, development, and implementation of software for a network of minicomputer based systems consisting of front ends, nodes, and local concentrators. You must have a minimum of 1 to 2 years experience in Assembler language with a general understanding of real time programming. Senior level applicants should have network experience with knowledge of BISYNC, 200 UT; HASP, HDLC, SDLC, X.25 or other communications protocols desirable.

In addition to a good salary and excellent benefits, we will offer you a stock purchase plan, tuition reimbursement, and pension program.

Please submit resume, including salary history, to:

LaVonne Chimbel
UNITED COMPUTING SYSTEMS, INC.
2525 Washington
Kansas City, Missouri 64108

or call
(816) 221-9700

PEOPLE, SYSTEMS AND SOLUTIONS UNITED

equal opportunity employer M/F/H

Programmers

SOFTWARE SPECIALISTS

New work combined with an expanded emphasis on software design and development has created immediate openings for computer professionals at our suburban Philadelphia location. These positions offer individuals the opportunity to join a growing organization with an excellent salary and benefit package.

PROGRAMMERS

Our Customer Systems Group is seeking key individuals with operating system and performance evaluation programming experience. Tasks will include the design and implementation of a distributed operating system and the support of a full-scale system benchmark for a unique multiprocessor real-time system. Experience with a DEC PDP 11/70, I/O interfaces, modeling and data communications is desirable.

MICROPROGRAMMERS

We are seeking talented individuals to participate in the development of advanced programs such as microprogrammed front-ends for message switching networks and an emulator for a Pascal-based soft architecture machine. Candidates should have experience with microprocessors and/or assembly language programming in a data communications environment.

SYSTEMS ENGINEERS

We have systems engineering openings in the areas of data communications networks, switching systems, intelligent terminals, new systems interfaces and many others. A BS in Computer Science or Engineering with some design experience involving systems engineering is required.

QUALITY ASSURANCE

Become part of a rapidly expanding field. Our QA department has positions available for individuals with a minimum of 5 years software experience. A background in software reliability or quality is a plus.

If you have experience in any of the above areas and wish to be considered for a position at our suburban Philadelphia location, reply in confidence by sending your resume and salary history to: **Owen Snyder, Burroughs Corporation, P.O. Box 517, Paoli, Pa., 19301 or call (215) 648-2403.** An equal opportunity employer m/f.

Burroughs

SENIOR PROGRAMMER

Batterymarch, an innovative investment advisor, needs a Senior Programmer for its in-house Time Sharing System to work on Transactions Systems, Management Information Systems and Investment Modeling. The candidate should be experienced in both Cobol and Fortran and be capable of working in an unstructured and challenging environment. Investment or Financial Systems Experience is desirable. **Send resume only to:**

Beverly Cancelliere
Vice President
Batterymarch Financial
Management Corporation
600 Atlantic Avenue
12th Floor
Boston, MA 02210

BATTERYMARCH
FINANCIAL MANAGEMENT
CORPORATION

MARKETING REPRESENTATIVE

Marketing representative to sell minicomputer hardware (Datapoint) and software package developed for petroleum jobbers. A strong working knowledge of small business accounting and operational environment is essential. Programming experience is not required but a fundamental knowledge of software concepts is important. You will be selling for a prestigious company with an excellent record of implementing solid systems. Prices for the complete package range from $40,000 - $140,000. Several geographic areas to choose from with an attractive commission program. Send resume to GSS, 155 S.W. Madison, Corvallis, OR 97330.

DATA PROCESSING PROFESSIONALS

We are a leading manufacturer of heavy electrical equipment, and are currently expanding the scope and responsibilities of our Management Information Services Department. This has created several new positions for motivated individuals seeking a challenging career opportunity.

SYSTEMS ANALYSTS

Qualified candidates must have a thorough knowledge of manufacturing systems, and be able to assume a key position in a systems development team that is installing a state-of-the-art MRP and shop floor control systems. Knowledge of MVS, IMS/DL1 will be beneficial.

We offer a competitive salary, a complete benefits package and an excellent opportunity for personal growth. For immediate consideration, applicants should send resume with salary history in complete confidence to:

R.V. KHALAP
T.I.M.E. PROJECT MANAGER
GOULD-BROWN BOVERI
POWER SYSTEMS DIVISION
11711 Woodruff Avenue
Downey, CA 90241

Equal Opportunity Employer M/F

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TECHNICAL WRITER

Software Language Manuals

a newly created position for a person with a technical writing and programming background

We are the world leader in environmental, fire and security control systems for commercial buildings and have a need for a person with a unique combination of talents who can put together software user manuals for computer based systems.

If your background includes 2 years programming experience (including assembly language, FORTRAN, Pascal or equivalent language) and 3 years of technical writing, you're the ideal candidate. At Honeywell you'll interface with our software engineering areas to independently develop software language user manuals as well as train other tech writers in software technology.

Offered is an above average compensation package including comprehensive benefits and tuition aid, and free dental coverage. For more information on this high visibility position write or call: Beth Wiseman, (312) 570-5318, HONEYWELL, 1500 W. Dundee Road, Arlington Heights, IL 60004.

Equal Opportunity Employer M/F

Honeywell

Telemedia, Inc., an international training services company has openings in Saudi Arabia for the following positions.

Computer Operations Supervisor

You will be responsible for the organization, plans and control of a new data processing center. Must have at least 3 years experience in operation of mini/computers, with some supervisory responsibilities.

Computer Operator

You will monitor, operate and control the computer. Require at least 1 year experience in operation of mini computer.

Prefer that candidates for both positions have some background in COBOL programming. A college degree in EOP or business a plus. You will be working with a Data General CS 60/C6 using an Interactive COBOL system.

We offer an attractive overseas compensation package and complete benefit plan. You will be required to sign a 2 year contract.

Please send complete resume including salary history in confidence to:

Telemedia, Inc.
Dept. CO
310 S. Michigan
Chicago, IL 60604

An Equal Opportunity Employer M/F

SOFTWARE SPECIALIST

We have an immediate opening for a Software Specialist at our North American operations in Des Moines, Ia. Successful candidate will possess the following qualifications:

- BA Degree in a business related field or computer science.
- 1 year experience in operations, computer services or COBOL IMS application programming.
- 1-to 2 years as an IMS VS software programmer or specialist with exposure to NCP/VTAM.

This position offers an attractive compensation package with liberal vacation and holiday provisions. Send detailed resume of education, experience, and salary history to:

B. W. Burkett
Massey-Ferguson, Inc.
1901 Bell Avenue
Des Moines, Ia. 50315

An Equal Opportunity Employer

Data Processing

SOFTWARE & HARDWARE PROFESSIONALS

SPECTRA MEDICAL SYSTEMS, Inc. designs and installs hospital-wide, minicomputer medical information systems utilizing proprietary software. Our system supports the activities of medical professionals throughout the hospital by providing on-line order entry and management of patient-related data and services.

Continued product development and increased sales have afforded us the opportunity to seek additional software professionals with 2-5 years experience with knowledge of top-down structure design, HIPO, ASSEMBLER and structered programming techniques is highly desirable. Exposure to C language, PASCAL, or ALGOL is a plus.

PROJECT MANAGERS

Application Software
Systems Hardware/Software

These positions are responsible for controlling and supervising activities for each project/projects within the specific dept. Responsibilities include development of project plans and schedules; establishment of work assignments and technical direction for the following positions.

PROGRAMMER ANALYSTS

Under general supervision will develop enhance and maintain software for projects within the support software dept. Will provide solutions to a variety of problems following established procedures and guidelines.

SYSTEMS ANALYSTS

Will gather and analyze information for developing and modifying computer systems, define system objectives, system operation and develop system test and conversion plans.

SYSTEMS ENGINEERS

You will be responsible for support of real-time multi-programming operating systems, applications software, data base access methods, systems utilities and performance evaluation. Support includes problem analysis and correction for installed client systems and our development facility. You must also be willing to travel.

HARDWARE ENGINEER

The hardware engineering personnel at Spectra are responsible for all phases of hardware implementation as well as technical support via telephone and on-site. You will provide site plans, system plans and on-site installation support.

We have already become a leading factor in the turn-key medical information system marketplace, offering excellent starting salary, comprehensive benefits and outstanding opportunities for personal recognition and professional growth.

SPECIAL ASSIGNMENTS IN SAUDI ARABIA

We have opportunities for both Programmer Analysts and Hardware Engineers to work on assignment at hospital sites in Saudi Arabia. We offer excellent living accommodations and an extremely attractive compensation package and additional benefits.

If you are seeking a unique challenge and rewards that are offered by a young, dynamic and rapidly growing company, please send a resume, with salary history, in confidence to Spectra Medical Systems, Inc. Attn: Gary Andrews, 330 Potrero Ave., Sunnyvale, Ca 94086. An Equal Opportunity Employer M/F.

SPECTRA MEDICAL SYSTEMS, INC.
A Unit of Whittaker Corporation

DIGITAL ELECTRONICS ENGINEER

Development and maintenance of microprocessor based computer systems (TMS 9900 CPU CHIP) I/O interface. D/A conversion. Solid background in development is needed. Excellent opportunity to work towards full system responsibility. Small progressive company environment.

Send resume or call after 5 pm, Mr. George Horn, 935-8670.

MIDDLESEX GENERAL INDUSTRIES
North Woburn Industrial Park
8 Adele Road
Woburn MA 01801

SYSTEMS ANALYST/CONSULTANT

Multi-office Central Wisconsin CPA firm is offering a career opportunity for a systems analyst in its consulting division. Applicant should have three to five years solid EOP experience with exposure to COBOL and RPG in a manufacturing environment. Hardware and software variety, various industries. Opportunity for exposure to health care, government and other areas. Excellent compensation for individual with initiative and leadership skills. Fringe benefits include paid retirement plan and great "quality of life". Send resume to:

MAS DEPARTMENT
Wipfli, Ullrich & Company
P.O. Box 666
Wausau, WI 54401

ITT Rayonier (Stamford, Connecticut)

■ SYSTEMS ANALYSTS (MANUFACTURING)

■ PROJECT LEADER

■ SR. ANALYSTS

ITT Rayonier, a dynamic forest products company, is seeking Analysts for its Stamford based data processing installation.

To qualify, you must have a degree or equivalent. In addition, the candidates we seek must have project leadership capability, good communications skills and preferably a manufacturing background in one of the following areas:

- **plant maintenance systems**
- **spare parts inventory systems**
- **purchasing systems**

Attractive starting salaries, comprehensive benefits and growth opportunity.

Send resume, including earnings history, to: B. Lyons, Personnel Department, ITT Rayonier Inc., 1177 Summer Street, Stamford, CT 06904.

ITT Rayonier Inc.

An Equal Opportunity Employer, M/F

AMCA International

AMCA International is perhaps the most dynamic company going today, and even more so — tomorrow. AMCA's world wide operations consist of 32 different companies and 48 manufacturing facilities. Sales during 1978 were approximately one billion dollars. Profits have maintained a 29% compounded annual growth rate in earnings per share. Our products include everything from chainsaws to cranes — from metal buildings to petroleum refineries. Our operating philosophy is to diversify strategically — no single industry, no single national dependence — and yet maintain the continuity of sustained, orderly growth. We offer a benefit package comparable to any in the area. We offer competitive salaries, challenge and potential, and an exciting environment — both today and tomorrow.

AMCA's Memphis, Tennessee Computer Center has two IBM 370/158's. Our Operating System is MVS and we offer CICS, CICS/PANVALET, and TSO to support our COBOL development efforts. Currently openings exist for

SYSTEMS ANALYSTS/SYSTEMS MANAGERS

These positions are located in several of our facilities across the U.S. and Canada.

If you desire a more dynamic, challenging and exciting future and have a minimum of two years COBOL EXPERIENCE, please send resume or call 1-901-372-6464

AMCA

Commercial Development
AMCA International Corp.
5775 Summer Trees Drive
Memphis, TN 38134

Data Processing

DIRECTOR OF DATA SYSTEMS AND SERVICES

Purdue University Calumet is seeking a Director who will have senior management responsibility for planning and managing the Computing Center. Reports directly to the Vice Chancellor for Administrative Services. The Center is responsible for providing high quality computer services to support both academic instruction and administrative data processing.

QUALIFICATIONS

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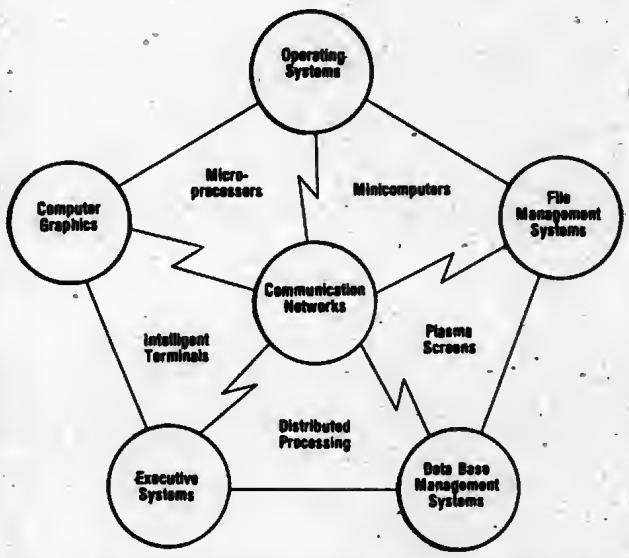

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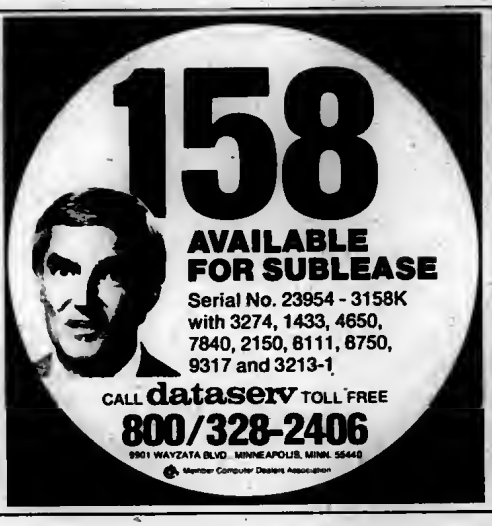

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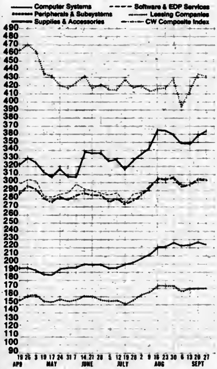
Computerworld Stock Trading Index



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Computerworld Stock Trading Summary

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

EXCH		1978-79 RANGE (1)	CLOSE SEP 26 1979	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
A	AMDAHL CORP	22- 64	22 1/8	+ 1/8	+0.5
N	BURROUGHS CORP	59- 87	78 7/8	+2 7/8	+3.9
O	COMPUTER AUTOMATION	11- 44	12 1/4	+1 1/4	+11.3
N	CONTROL DATA CORP	23- 50	48 3/8	+1	+2.1
O	CRAY RESEARCH INC	8- 40	40	+2 3/4	+7.3
N	DATA GENERAL CORP	42- 78	67 3/4	+ 1/8	+0.1
N	DATAPOINT CORP	34- 88	87 1/4	+1 5/8	+1.8
N	DIGITAL EQUIPMENT	39- 66	66	+ 3/4	+1.1
N	ELECTRONIC ASSOC.	2- 13	8	- 5/8	-7.2
A	ELECTRONIC ENGINEER.	9- 19	15 1/2	+1	+6.8
N	FOUR-PHASE SYSTEMS	18- 48	39	+2	+5.4
N	FOXBORO	28- 44	38 3/4	+ 1/4	+0.6
O	GENERAL AUTOMATION	1- 26	16 1/2	+2	+13.7
O	GRI COMPUTER CORP	1- 3	7/8	- 1/8	-12.5
N	HEWLETT-PACKARD CO	24- 59	57 1/2	+ 1/2	+0.8
N	HONEYWELL INC	43- 83	79 3/8	+1 3/8	+1.7
N	IBM	60-121	68 1/8	+ 3/8	+0.5
O	MANAGEMENT ASSIST	9- 29	22 1/8	- 1/4	-1.1
O	MANUFACTURING DATA S	4- 31	30 3/4	-1 1/4	-1.8
O	MICRODATA CORP	10- 32	32	+ 1/4	+0.7
O	MINI-COMPUTER SYST	4- 8	4 1/4	- 1/8	-2.8
O	MODULAR COMPUTER SYS	7- 18	13	-1	-7.1
N	NCR	37- 81	75 1/2	+ 3/8	+0.4
A	PRIME COMPUTER INC	4- 22	17 3/4	+ 1/2	+2.8
N	PERKIN-ELMER	17- 36	30 5/8	- 1/8	-0.4
N	SPERRY RAND	33- 62	58 1/8	- 3/8	-0.7
A	SYSTEMS ENG. LABS	11- 24	13 1/4	- 1/2	-3.4
O	TANDEM COMPUTERS INC	13- 37	35	+1 1/4	+3.7
A	WANG LABS.	9- 25	23	0	0.0
	LEASING COMPANIES				
O	BOOTHE COURIER CORP.	13- 21	17	0	0.0
O	COMDISCO INC	3- 21	18 1/8	+ 1/4	+1.5
A	COMMERCE GROUP CORP	1- 1	1/2	0	0.0
A	COMPUTER INVSTRS GRP	1- 7	3 1/4	0	0.0
O	CONTINENTAL INFO SYS	4- 14	9 1/2	0	0.0
N	DATRONIC RENTAL	1- 4	2 7/8	0	0.0
A	DCL INC	3- 5	5 1/4	0	0.0
N	DPF INC	4- 14	4 7/8	- 1/8	-1.2
N	ITEL	4- 10	4	- 3/4	[illegible]
N	LEASCO CORP	24- 55	51 1/2	-1 7/8	[illegible]
O	LEASPAC CORP	1- 4	3/4	0	0.0
A	PIONEER TEX CORP	3- 7	3 1/8	+ 1/8	+4.1
N	U.S. LEASING	13- 21	18 3/4	0	0.0
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 2	1 1/4	- 1/8	-9.0
O	ANACOMP INC	8- 24	23 1/2	- 3/8	-1.6
A	APPLIED DATA RES.	8- 17	11 5/8	- 1/4	-2.1
N	AUTOMATIC DATA PROC.	26- 37	36 3/4	+ 5/8	+1.7
O	COMPU-SERV NETWORK	5- 16	13	-1	-7.1
O	COMPUTER HORIZONS	1- 4	3	+ 1/8	+4.0
O	COMPUTER NETWORK	5- 18	6	+ 1/4	+4.3
N	COMPUTER SCIENCES	8- 17	15 1/2	0	0.0
O	COMPUTER TASK GROUP	1- 7	4 1/2	0	0.0
O	COMPUTER USAGE	2- 4	2 1/4	- 1/4	-10.0
O	COMPUT AUTO REP SVC	4- 10	6 1/2	0	0.0
O	COMSHARE	8- 25	15 1/2	+ 3/4	+4.7
O	CULLINANE CORP	14- 31	24 3/4	+1 1/4	+5.3
O	DATA DIMENSIONS INC	2- 8	2	0	0.0
O	DATATAB	1- 4	1 1/4	-1	-44.4
N	ELECTRONIC DATA SYS.	15- 24	24 1/8	- 3/4	-3.0
O	INSYTE CORP	1- 3	1 3/8	0	0.0
O	IPS COMPUTER MARKET.	2- 3	3	0	0.0
O	KEANE ASSOCIATES	3- 5	5	- 1/4	-2.6
O	KEYDATA CORP	1- 4	4 1/8	+ 3/8	+9.0
O	LOGICON	10- 19	14 3/8	+ 7/8	+5.0
O	NATIONAL DATA CORP	7- 15	15 1/8	+ 5/8	+4.3
A	ON LINE SYSTEMS INC	12- 30	25 1/2	+ 3/4	+3.0
N	PLANNING RESEARCH	4- 10	5 3/8	+ 1/8	+1.9
O	PROGRAMMING & SYS	1- 1	1 1/4	+ 1/8	+11.1
O	RAPIDATA INC	3- 7	4 1/8	0	0.0
O	REYNOLDS & REYNOLDS	18- 40	11 1/4	+1 1/2	+4.7
O	SCIENTIFIC COMPUTERS	3- 9	7 1/8	- 1/8	-1.3
N	TYMSHARE INC	14- 25	26	+1 1/8	+4.2
A	URS SYSTEMS	5- 9	7 1/8	+ 1/8	+1.7
N	WYLY CORP	1- 7	5	+ 1/8	+2.1
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	13- 32	17	- 1/4	-1.4
N	AMPEX CORP	10- 19	14 1/8	- 1/4	-3.3
O	ANDERSON JACOBSON	5- 12	11 3/4	+ 1/2	+4.4
N	APPLIED DIG DATA SYS	8- 22	8 3/8	- 1/2	-5.6
O	BEEHIVE INT'L	3- 7	4 1/8	- 1/8	-2.9
A	BOLT BERANEK & NEW	6- 15	14 3/4	- 1/4	-1.6
N	BUNKER-RAMO	10- 29	29	+3 1/4	+12.4
O	CALCOMP	3- 13	9 5/8	- 1/4	-2.5
O	CAMBRIDGE MEMORIES	2- 4	2	0	0.0
N	CENTRONICS DATA COMP	16- 56	51	+ 1/4	+0.4
O	COGNITRONICS	1- 4	2 1/2	0	0.0
O	COMPUTER COMMUN.	6- 10	7 3/8	- 7/8	-10.6
O	COMPUTER CONSOLES	4- 16	13 1/4	+ 1/4	+1.8
A	COMPUTER EQUIPMENT	3- 6	5 1/4	+ 1/8	+2.4
O	COMPUTER TRANSCEIVER	1- 5	3 1/4	- 1/4	-6.2
O	COMPUTERVISION CORP	9- 39	38 3/8	+3 1/8	+8.7
N	CONRAC CORP	14- 25	16 3/4	0	0.0
O	DATA ACCESS SYSTEMS	8- 10	8 1/4	+ 3/8	+4.7
O	DATA PRODUCTS CORP	13- 25	17 1/2	+ 5/8	+3.7
O	DATUM INC	2- 8	2 1/8	0	0.0
O	DECISION DATA COMPUT	2- 5	4 1/8	- 1/8	-2.9
O	DELTA DATA SYSTEMS	1- 1	3/4	+ 1/8	+20.0
A	DOCUMATION INC	8- 34	21 1/4	- 3/4	-3.4
O	DATARAM CORP	8- 32	27 1/2	+4	+17.0
N	ELECTRONIC M & M	3- 9	3 3/4	+ 1/8	+3.4
O	FABRI-TEK	1- 2	5/8	- 1/8	-21.3
O	GENERAL COMPUTER SYS	1- 3	2 3/4	0	0.0
O	GENERAL DATACOMM IND	9- 21	17	- 1/2	-2.8
N	HAZELTINE CORP	10- 18	17	0	0.0
N	HARRIS CORP	17- 38	32 1/4	- 1/4	-0.7
O	INFOREX INC	4- 11	4	- 3/8	-8.5
O	INFORMATION INTL INC	7- 12	8 1/4	- 1/2	-5.7
O	INFOTON	1- 1	2 1/4	0	0.0
O	INTEL CORP	40- 65	63	+3	+5.0
O	INTERSIL	7- 22	24 3/4	+ 3/4	+3.7
A	LUNDY ELECTRONICS	6- 4	4 3/4	+ 1/8	+1.9
O	MSI DATA CORP	7- 10	7 3/4	0	0.0
N	MEMOREX	20- 44	29 3/4	-2	-6.7
N	MOHAWK DATA SCI	8- 15	12 1/2	- 5/8	-4.7
O	OMEX	2- 8	7 1/2	0	0.0
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O	PENRIL CORP	3- 12	10 1/8	+ 1/2	+5.1
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O	SCAN DATA	1- 5	1 3/4	-	-1.3
N	STORAGE TECHNOLOGY	15- 46	17 3/4	+ 1/2	+2.9
O	T BAR INC	11- 25	24 1/2	0	0.0
O	TALLY CORP.	4- 14	12 3/4	0	0.0
A	TEC INC	4- 11	4 1/8	0	0.0
N	TEKTRONIX INC	38- 60	60 1/4	+ 7/8	+1.4
A	TELEX	3- 8	6 5/8	- 1/8	-2.8
O	TESDATA SYSTEMS CO	9- 26	9 1/4	-1 1/4	-10.3
O	WILTEK INC	1- 2	1/2	0	0.0
	SUPPLIES & ACCESSORIES				
A	AMERICAN BUS PRODS	9- 12	11 1/2	- 1/2	-4.1
O	BALTIMORE BUS FORMS	3- 4	3/4	0	0.0
N	BARRY WRIGHT	14- 36	27 1/4	- 3/8	-1.4
O	CYBERMETICS INC	1- 3	1	0	0.0
O	DUPLEX PRODUCTS INC	13- 31	27 3/8	- 3/4	-2.6
N	ENNIS BUS. FORMS	9- 21	18 1/8	0	0.0
N	3M COMPANY	43- 64	52 3/4	- 1/4	-0.4
O	MOORE CORP LTD	28- 36	31 3/4	- 1/4	-0.8
N	NASHUA CORP	14- 47	44 3/8	-1 5/8	-3.5
O	STANDARD REGISTER	18- 24	27 1/4	- 1/4	-0.9
A	TAB PRODUCTS CO	8- 14	17 7/8	- 1/8	-0.6
A	WABASH MAGNETICS	10- 22	15 1/4	-1 1/8	-6.9
N	WALLACE BUS FORMS	18- 34	24 1/8	+ 1/8	+0.4

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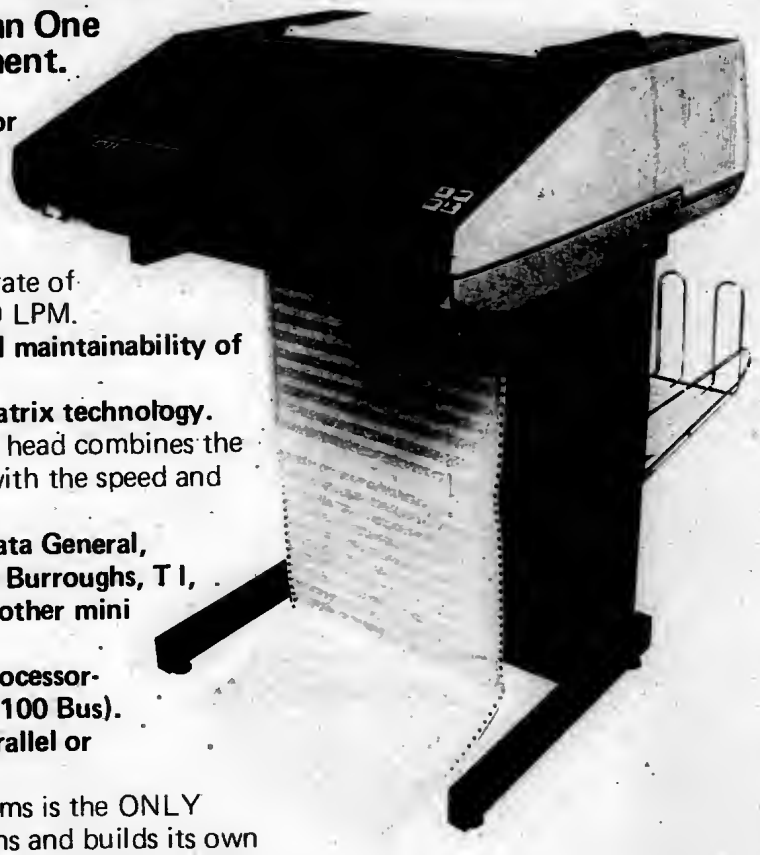

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  The M-200's 14-wire matrix head combines the flexibility of a single head with the speed and long-life of multiples.
- ☑ **Compatibility with DEC, Data General, Hewlett-Packard, Interdata, Burroughs, T I, Honeywell, Centronics and other mini systems.**
- ☑ **Compatibility with microprocessor-based computer systems (S-100 Bus).**
- ☑ **Reliable SSI interfacing, parallel or serial.**
  Remember, Southern Systems is the ONLY printer company that designs and builds its own computer-to-printer interfacing for the full DEC line, all DG systems and many other processors, both parallel and serial.
- ☑ **Expanded, condensed and standard character sizes; up to six clear copies.**
- ☑ **Easy forms loading, front or bottom.**
- ☑ **Diagnostic display.**
- ☑ **30-day delivery.**

SSI **SOUTHERN SYSTEMS, INC.**
3000 Northeast 30th Place
Fort Lauderdale, Florida 33306 (305) 561-5226 **(800) 327-6929**

To SSI Marketing:
Sounds like the M-200 may answer my printer needs. Please send more information. I'd also like to know more about your:
____300/600 lpm low cost band
____2550 (1500 lpm charaband)
____2200 series (300, 600, 900 lpm drum)
____CT 1200 series (600, 1000, 1200 lpm ChainTrain)
____SI-22 Serial Interfacing
My needs are:
__Immediate.__3-6 months.__For Information Only.

Name _____
Company _____
Address _____
City _____ State _____ Zip _____
Telephone _____
My computer type is _____